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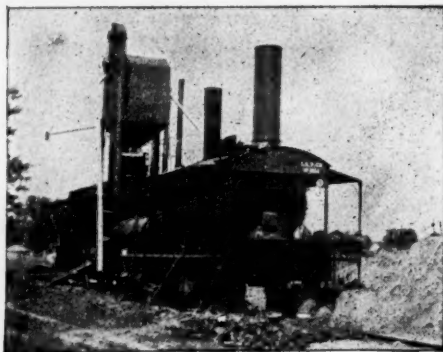
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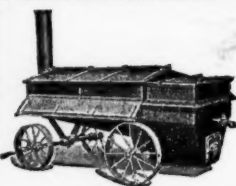
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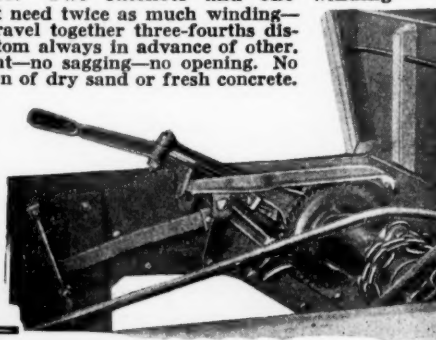
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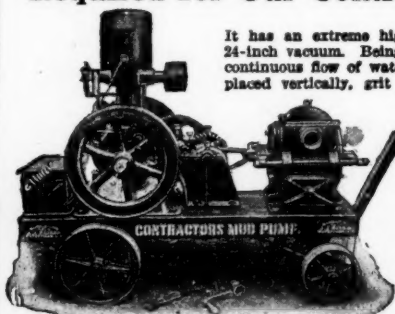
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## MONEY VALUE OF LIGHT AND AIR.

Where "the sky is the limit" for height of buildings, it  
may also be the only direction from which light can be ob-  
tained by older buildings surrounded by ambitious neighbors;  
which means that skylight windows are the only ones that  
receive direct light, and these receive sunlight for only a  
few hours a day. The actual deterioration of property value  
caused by such a condition may not always be realized.

An illustration is cited in the Newark building zone re-  
port in this issue. After the destruction by fire of the Equit-  
able building in New York, owners of the surrounding land  
offered to pay two and a quarter million dollars if the new  
building would be restricted to a height of eight stories. This  
was a closely figured business proposition, and demonstrates  
that the absence of a building height ordinance limiting the  
height to 100 feet cost these two or three properties at least  
that amount of money in rental values capitalized.

No matter how high a new building may be carried, a  
newer can be carried higher unless restrained by law, and  
no builder can be assured that the value of his property will  
not be lowered disastrously by overshadowing buildings in  
a year or two after construction.

A citizen is as surely entitled to protection by the city  
from this theft of property value as from theft of his purse  
by robbers or of his good name by libel.

## NON-RIGID PAVEMENT FOUNDATIONS.

It has come to be accepted by many engineers as a  
foregone conclusion that a so-called "permanent" pavement  
must have a cement-concrete base, this including brick,  
wood block, stone block, sheet asphalt, and in many cases  
bituminous concrete also. It is true that several prominent  
authorities have contended that a bituminous concrete base  
was preferable for a bituminous surface, and that many  
brick pavements laid directly on a sand foundation and stone  
block ones laid on gravel have given excellent service;  
but such construction has generally been looked upon as  
out of date and make-shift.

At the convention of the American Society for Muni-  
cipal Improvements, however, several prominent paving ex-  
perts advocated the use of old macadam, and even the lay-  
ing of new macadam, as preferable to laying a new con-  
crete base for these durable pavements. This was not solely  
or even chiefly because of the saving in cost—in fact most  
of the speakers said little conceiving this—but because of  
the advantage of a porous, non-rigid base. One paper con-  
tained the statement that, for a bituminous wearing sur-  
face, rigidity of base "is actually detrimental under many  
if not most conditions of subsoil and drainage." For brick  
pavement, a rolled broken-stone base was recommended as  
practically eliminating injury from frost action. Bituminous  
concrete wearing surfaces on a telford base were found, in  
Essex county, New Jersey, to have suffered less from four  
years of wear than similar surfaces on concrete base.

These papers, abstracted in this issue, will furnish in-  
structive reading to those interested in paving.

## BUILDING ZONES FOR NEWARK.

Commission on Building Districts and Restrictions Reports Complete Plan for Zoning, with Proposed Ordinance—Use, Height and Area Districts—Some Unusual Features.

In the issue for March 2, 1916, of Municipal Journal we published a synopsis of a report of the City Planning Commission of Newark, N. J., dealing with proposed changes in the street plan of the city and planning the street layout for future extensions. A "Commission on Building Districts and Restrictions" has since then been considering the subject of building zones for that city, and on September 16th, 1919 approved a report on the subject, together with a draft of a building zone ordinance which it recommends for adoption by the city commissioners. In the following article are given extracts from and a condensation of such parts of this report as seem to us to be of general interest.

"In New York the testimony of real estate experts is almost unanimous that the adoption of the zoning law has stabilized land values. The effect of the zone plan has been particularly noticeable in the districts reserved for detached houses. In such districts there has been an increased demand for private residences since the enactment of the zoning law. The restrictions have resulted in a great improvement of real estate conditions in such neighborhoods."

"Business streets, too, are feeling the wholesome effects of the law. Keeping business off residential streets means keeping it on business streets. Haphazard development hurts business property as much as it does residence property. The sporadic store invading quiet home streets not only demoralizes residential values; in decentralizing the shopping district it also disintegrates business values."

"How zoning can be made of as great help to industry as to residence and business is well illustrated in the case of Alameda. Since the adoption of its zoning ordinance the city has commenced the construction in its industrial district of a belt line railroad which will serve all factories, connecting them not only with each of the several railroads, thus relieving the factories from domination by any one railroad, but with the waterfront so that freight can be floated across San Francisco Bay in carload lots. A highway nowhere less than one hundred feet in width, skirting the edge of the industrial district throughout the length of the city has also been planned. Laid out for the purpose of facilitating the movement of factory traffic, this street will be improved in such a manner that its pavement will stand up under heavy loads and endure hard wear. The protection of the district against fire is also being looked into by the city. So long as factories were allowed to locate anywhere in the city it was difficult to serve them with sufficiently large water mains. But now, as factories may in the future be located only in one district, the city can readily afford to give them all the fire protection they need."

"That the relative competitive strength of a city in the domestic and foreign markets of the world is frequently conditioned to quite as great an extent by the arrangements of

the industries within the city as by the availability of raw materials and the proximity of a consuming public is just beginning to dawn upon us. Economical means of transferring and distributing freight within the city contribute proportionately no less to the development and expansion of its commercial and industrial hinterland than efficient outside connections by rail and water. Heavy terminal costs are as much a drag upon a city's prosperity as high freight charges. Every cent saved in needless trucking means just that much more money available for the extension of the city's commercial and industrial radius by rail and water.

"When factories and warehouses are not located with reference to freight terminals, a situation frequently develops where the downtown streets are unnecessarily congested to the inconvenience and financial loss of the whole city. A similar condition results where mutually interdependent industries locate in widely separated parts of the city instead of near one another. It is maladjustments of this kind that zoning is designed to remedy."

This is a part of the expressed opinion of the "Commission on Building Districts and Restrictions" of Newark, N. J., as contained in the introductory part of its report just issued. The report continues by calling attention to the "economic waste and destruction wrought by unregulated building" in Newark, which condition it is believed would be alleviated by the adoption of the restrictions proposed.

Three general classifications of the city are proposed—Use Districts, Height Districts, and Area Districts.

### USE DISTRICTS.

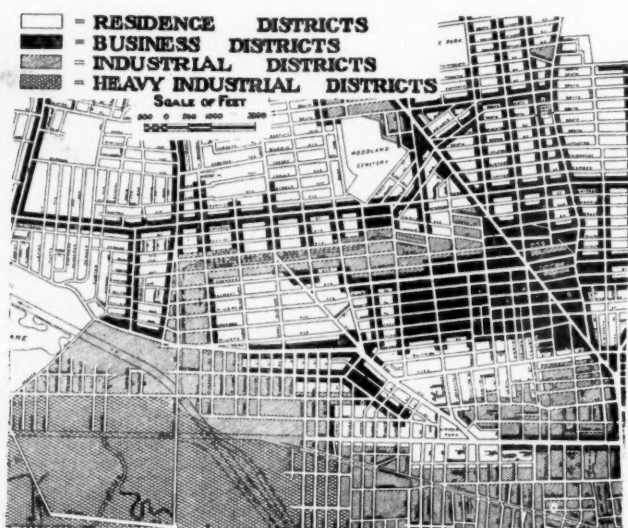
Four classes of use districts are proposed for Newark: residence districts, business districts, industrial districts, and heavy industrial districts. The regulations suggested for the several districts are as follows:

**Residence Districts.**—In a residence district, buildings may be erected only for certain specified uses. The uses that are not specifically permitted are prohibited. The uses allowed are: dwellings and tenements; lodging and boarding houses; hotels; churches; schools, libraries and public museums; hospitals and sanitariums; private clubs; philanthropic and eleemosynary institutions; railroad passenger stations; and nurseries and green houses. Uses customarily accessory to the above uses and located on the same lot are also allowed. Garages for more than five motor vehicles are not permitted as an accessory use.

**Business Districts.**—In a business district buildings may be erected for any use that is not specifically prohibited. The uses excluded from business districts are: garages (except after a public hearing by the board of appeals); blacksmith shops; horse-shoeing establishments; milk bottling and distributing stations; carpet and bag cleaning establishments; coal yards; lumber yards; car barns; junk yards; and those trades and industries that are prohibited in an industrial district. The manufacture of such products as are sold at retail on the premises to the ultimate consumer is allowed in a business district: manufacturing that does not come within this description is prohibited.

The business districts in a general way embrace the principal thoroughfares traversing the different residence sections throughout the city and those tenement house districts which have been so badly invaded by business as to make it impracticable to maintain them exclusively for residence purposes. Due to the large number of factories already there, the downtown business section could not be treated as a business district. The only exception to this rule is found in the case of Broad and Market streets, which it was deemed feasible to include as a business district.

**Industrial Districts.**—In an industrial district, buildings may, as in a business district, be erected for any use that is not categorically excluded. The trades and industries banned



USE DISTRICT MAP OF A SECTION OF NEWARK.



are all of a noxious or offensive character by reason of the emission of noise, odor, dust or gas, embracing among others, boiler works, acid plants, garbage incinerators, foundries, smelters, slaughter houses, stone crushers, and tanneries.

The industrial districts include large areas outside of the meadows and are found chiefly along the railroads, the Passaic river, the canal, the downtown business section with the exception of Broad and Market streets, and small scattered areas in various parts of the city already developed with industry.

**Heavy Industrial Districts.**—In a heavy industrial district the only use for which buildings may not be erected is for residential purposes. This exclusion, however, does not apply to the erection and maintenance of dwelling quarters in connection with an industrial establishment for the family of one watchman employed upon the premises.

The heavy industrial districts include the greater portion of the meadows and such parts of the Ironbound District as are already devoted to the more offensive trades.

**Exclusion of Residences from Heavy Industrial District.**—The exclusion of residences from the heavy industrial district is a special feature of the scheme for Newark. The very reasons that make it desirable to exclude nuisances from residence districts apply with equal, if not greater, force when it comes to prohibiting the erection of new buildings in a district which will in the main be developed with trades and industries especially offensive by reason of the emission of odor, dust, gas or noise. If it is unhealthful for people to live near an isolated factory in a residence district, it is all the more unhealthful for them to live in an isolated residence in a heavy industrial district. Any dwellings erected among the heavier industries in the meadows are doomed in advance to become slums. Wholesome homes simply cannot be maintained under an environment having its character fixed by chemical plants, tanneries, shipways, foundries, and railroad yards.

Factories demand large plots with switching facilities and wide streets improved with pavements that will stand up under the heaviest trucking; dwelling houses require small lots and streets of a sufficient width to serve only the local traffic. The treatment accorded in the two cases is radically different, not only in the subdivision of the land but also in its physical development afterwards.

#### HEIGHT DISTRICTS.

**Flat Height Limits vs. Limits Based on Street Widths.**—In working out the height regulations it was deemed better to establish a flat height limit than to vary the height in each particular case according to the street width.

The only exception to this rule is in the case of the narrow streets in the downtown business section, where the application of the height limit generally applicable to buildings in the district will permit the erection of too high buildings. These streets, which in many instances have a width of only thirty and forty feet, are, moreover, so interspersed between wider streets that it is impracticable to segregate them in a separate district with a lower height limit than that applied to the wide streets. In this part of the city, therefore, a multiple of the street width is used to supplement the flat height limit suggested for the district as a whole.

The flat height limit for this district as a whole is 150 feet. But buildings of this height are limited to streets having a width of at least 75 feet.\* On streets having a width of less than 75 feet, the height may not exceed twice the width of the widest street upon which the building fronts. In applying this rule, however, no street is deemed to have a width of less than fifty feet, so that even under the most unfavorable circumstances a building is permitted a height of at least 100 feet.

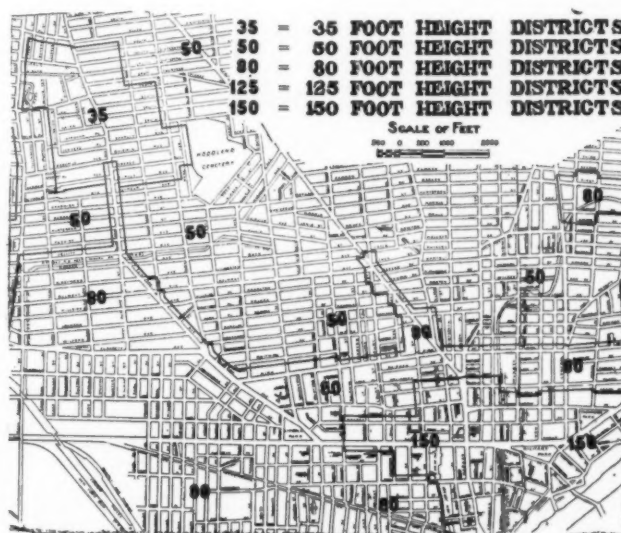
A height limit based exclusively upon a multiple of the street width is objectionable in that it does not promote a uniform type of development throughout a district. Being based upon the street width, it allows higher buildings upon

the wider streets, and thus actually invites the location of buildings that will not comport with the general character of the neighborhood. High apartments in a high class private house district are only a little less objectionable than stores. The fact that they happen to be located on a wide street hardly mitigates the injury, as the blight suffered by the adjoining houses is identically the same no matter how wide or narrow the street is on which the apartments front.

Where the height limit is based upon a multiple of the street width, it will usually be found necessary to establish several different classes of height districts, each using a different multiple of the street width. Thus, in New York there are five classes of height districts, two and one-half times districts; two-times districts; one and one-half times districts; one and one-quarter times districts; and one time districts. The height limit, therefore, varies not only according to the width of the street but according to the district in which the building is situated. In applying the New York multiples to only six sets of different street widths, 50, 60, 70, 80, 90 and 100-foot streets, one obtains no less than twenty-two separate and distinct height limits. Whatever may be the need for such a multiplicity of different height limits in New York, it is quite certain that in Newark the application of this method in limiting the height of buildings would not secure the best results, for there would often be a greater difference between the height limits established for the widest and narrowest streets within a district than would be the case on the narrowest and widest streets in different districts, and in many instances higher buildings would be allowed on the wider streets in a district apparently subjected to a more stringent restriction than would be allowed on the narrower streets in a district with a more liberal multiple.

There is also another point against adopting a multiple of the street width as a basis for controlling the height of buildings which is entitled to considerable weight. It is this: The wide streets were laid out ostensibly with a view of providing thoroughfares of an adequate width to serve metropolitan through traffic. If they are not to be diverted from this purpose, it is essential that the buildings on them be kept down to approximately the same height as on the neighboring streets of a lesser width, or the increased local traffic resulting from the higher buildings will seriously prejudice their serviceability for through traffic.

**Shadows Cast by Buildings.**—It would be no less than a public calamity for Newark to develop with buildings as high as those in Manhattan, where a preponderating majority of the rooms in the existing shops, factories, offices and apartments receive absolutely no direct sunshine on the shortest day in the year. The shadow cast by a building as on the neighboring streets of a lesser width, or the in- at eight o'clock in the morning, over ten times as long as the building is high. At nine o'clock it is four times. By



HEIGHT DISTRICT MAP OF A SECTION OF NEWARK.

\*In the report and ordinance, "where a street borders a public park or a navigable body of water, the width of the street is the mean width of such street plus the width, measured at right angles to the street line, of such public park or body of water, but not more than seventy-five feet in any case."

ten o'clock it has shortened to two and two-thirds times the height of the building. The shadow continues getting shorter until noon but even then its length is equal to twice the height of the building.

We cannot escape the physical fact that the duration of the sunshine period obtainable in rooms on the ground floor varies inversely to the height of the building. In Newark on a north-and-south street improved uniformly with buildings of a height equal to one-half the street width, the sunshine period obtainable on the ground floor within buildings is one hour and forty-nine minutes on December 21st.\* If the height of the building is increased to once the street width this period is reduced to fifty-two minutes. With buildings one and one-half times the street width in height it shrinks to twenty-two minutes and with buildings twice the street width in height to twelve minutes. The ground floors of buildings two and one-half times the street width in height receive absolutely no sunshine.

But the erection of high buildings cuts off not only the sunlight but also the daylight received by the lower floors. The facade of an unobstructed building in the country receives 100 per cent of the maximum possible direct daylight incident on a vertical surface. The front facade of a building at the ground level receives 89.4 per cent of this maximum where a street is flanked on either side with buildings of a uniform height equal to one-half the street width. If the height of the buildings is increased to equal the width of the street the direct daylight is reduced to 29.2 per cent of this maximum. With each increase in height this amount steadily diminishes, being 10.4 per cent. when the height is twice the street width; 5.1 per cent when thrice the street width; and 2.9 per cent when four times the street width.

*Commercial Value of Light and Air.*—A city improved generally with low buildings is not apt to appreciate that sunlight and daylight have a very distinct commercial value. An isolated building projecting high above its neighbors enjoys, of course, an abundance of light and air but it loses this advantage when the district becomes uniformly improved with high buildings.

The monetary interest possessed by owners of skyscrapers in keeping adjoining buildings low is well illustrated in Manhattan by their purchase of easements in the light and air over neighboring buildings above a certain height. After the destruction of the old, and before the erection of the new Equitable Building there, the owners of some of the surrounding land bargained for the purchase of an easement in the light and air above a height of eight stories from the ground. The Equitable Building Corporation was willing to sell such an easement for two and a half million dollars but the project failed as the adjoining property owners were willing to subscribe only two and a quarter millions toward the purpose.

*Proposed Height Districts for Newark.*—Five classes of height districts are proposed for Newark: 150 foot districts; 125 foot districts; 80 foot districts; 50 foot districts; and 35 foot districts.

Of the 150-foot height districts there is only one, the downtown business section. This limitation will permit the erection of twelve-story buildings. It seemed undesirable to encourage the construction of higher buildings than this for several reasons. First, we are peculiarly fortunate in our topography. The business district is not cramped for room in which to expand. Unlike some cities, we have abundant space for the lateral extension of our retail section—it does not need to extend vertically. Secondly, there are as yet only three buildings in the city that exceed a height of 150 feet. It is therefore not necessary to establish an excessively high limit in order to avoid unfair discrimination between existing and prospective buildings. A 150-foot height limit will be fair to both. Thirdly, there is the matter of light and ventilation.

Of the 125-foot height districts there is also but one. This is a district in the meadows which appears susceptible

\*This is on the assumption that the size of the glass surface in the window is thirty-two inches wide and sixty-one and one-half inches high, the opening between the stop beads being thirty-six by sixty-six inches. The walls in which the windows are set are assumed to have a thickness of eight inches.

of a large warehouse terminal development but which does not require a greater height than ten stories.

The 80-foot height districts embrace the great bulk of the industrial areas in the city as well as those apartment house areas which are most available for the erection of six and seven story buildings.

The 50-foot height districts contain those areas which seem to be destined for three and four-story apartments.

The 35-foot height districts are confined to those neighborhoods that should be protected so far as possible for one and two-family houses.

*Towers.*—To absolutely prohibit the erection of towers in Newark, it was felt, would be a mistake. They lend variety to the skyline and embellish a city as few structures do. A single Woolworth tower instills more civic pride than a hundred giant skyscrapers occupying the entire lot. If sufficiently numerous, towers might conceivably obstruct the light and ventilation of neighboring buildings, but when they are suitably located and surrounded by adequate open space the objection to them on this score is reduced to a minimum. Moreover, it is not to be expected that they will ever be erected in great numbers. Their cost of construction renders this improbable.

The proposed zoning ordinance, therefore, permits towers of any height subject to two conditions: (1) that they occupy no more than 25 per cent of the lot area; and (2) that an open space be provided, above the height limit fixed for building in the district, on each and every lot line that is not also a street line. In other words, towers are allowed on the street line but not on the property line. The width of the open space that must be left on the lot lines is proportioned in each case to the height of the tower above the height limit established for ordinary buildings in the district.

(To be concluded.)

## DISINFECTION OF SEWAGE.\*

Results Obtained at Millville and at Camp Merritt by the Use of Chlorine Gas—Tests Made by State Department of Health.

By CHESTER G. WIGLEY,†

In the state of New Jersey, many municipalities have been required to sterilize the sewage because of the fact that the area in which shell fish are grown or where people bathe, or streams from which people derive water-supplies, would otherwise be seriously and often disastrously polluted. The results of such disinfection have in general been very satisfactory, but depend primarily upon the person operating the plant, who must be conscientious and painstaking in the performance of his duties.

The purpose of this paper is to give the results obtained when disinfecting the sewage at one or two places in that State.

At the city of Millville, N. J. a sewage treatment plant had been constructed consisting of settling basins, an aerating basin, contact beds and tidal storage basin. Because of the increase in the flow of sewage and backing up of the tide into the contact beds the results obtained had seldom been satisfactory. The effluent from the plant was discharged into the Maurice river which is used about twelve miles below the city for the floating of shell fish. The poor quality of the effluent resulted in complaints being made to the State Department of Health by people operating the shell fisheries, as they were threatened with loss of business because of the pollution of the floating areas. The city, because of a recent program of municipal improvements, had very nearly reached its bonded indebtedness limit and the municipal officials stated that it was impossible for them to extend the existing works, providing adequate capacity for proper treatment of the sewage in the existing type of plant. Some tests made by the State Department of Health of New Jersey had before this time demonstrated the possibility of obtaining a satisfactory effluent by the use of chlorine gas as a disinfecting agent.

\*From "The Cornell Civil Engineer" for October, 1919, somewhat condensed.

†Formerly chief engineer of the State Board of Health of New Jersey; now with Wallace & Tiernan Co.



The results obtained during these tests are given in the accompanying table:

gave a table showing the result for 57 days during this period. From this it appears that, using about 4 parts per mil-

RESULTS OBTAINED WHEN DISINFECTING THE SEWAGE OF THE CITY OF MILLVILLE, N. J., WITH CHLORINE GAS, AUGUST 3, 4 AND 5, 1916. BACTERIA PER C. C. 37°

P. P. M. Cl.	Total	Before Treatment		After Treatment		B. Coli	% Reduction	B. Coli	% Reduction
		Colonies	B. Coli	Colonies	B. Coli				
3.7	150,000	100,000	0.00001	1,000	99+	Less than 1000	99+	.001	99
3.7	400,000	150,000	0.00001	45,000	89	20,000	87	.001	99
3.7	300,000	220,000	0.000001	7,000	98	3,000	98+	.001	99.9
4.2	210,000	100,000	0.00001	4,000	98	1,000	99	.01	99
4.2	180,000	110,000	0.00001	7,000	90	Less than 1000	99+	.01	99.9
5.8	40,000	40,000	0.0001	2,000	95	Less than 1000	98	.1	99.9
5.8	300,000	200,000	0.000001	Less than 1000	99.9	Less than 1000	99.9	.01	99.9
6.3	150,000	100,000	0.0001	1,000	99+	Less than 1000	99+	.1	99.9
6.3	200,000	130,000	0.0001	Less than 1000	99+	Less than 1000	99+	.1	99.9
6.3	220,000	170,000	0.00001	Less than 1000	99+	Less than 1000	99+	.1	99.9
7.1	290,000	80,000	0.00001	300	99.9	Less than 1000	99+	.01	99.9
7.1	370,000	190,000	0.00001	900	99.7	300	99.8	.1	99.9

It was therefore finally decided that the most economical and expeditious procedure was for the city of Millville to provide proper equipment for the sterilization of the sewage, with laboratory facilities and a qualified man in charge of the laboratory to make daily tests of the effluent. Before proceeding to give the results of this treatment it will be advantageous to give a brief survey of the conditions at the city relative to the sewage disposal works.

The city of Millville, N. J. had a population of over 13,000, the town being situated in the southern portion of New Jersey, and the surface of the ground being gently sloping towards the Maurice river. The grades of the sanitary sewer system are mostly low. The daily sewage flow, from measurements made by means of a weir placed at the outlet of a settling basin, averaged 1,300,000 gallons per day; the maximum rate of flow being 1,350,000 per day. As the sewage

lion of chlorine, the reduction of B. Coli ranged from 90% to 97.5%, and those determined on agar plates from 81% to 97.7%; using about 5 parts, the reduction was—B. Coli, from 87% to 97%; agar plates, 96.4% to 99.1%; using about 6 parts—B. Coli, from 80% to 99.5%; using about 7 parts—B. Coli from 90% to 100%, agar plates, 98.3% to 99.9%. The number of B. Coli in the treated effluent ranged from 0 to 1,000 per c. c., averaging 303; and the number on the agar plates ranged from 525 to 52,000, averaging 9,340. The average reduction of B. Coli was 94.7%, and by agar plate determination, 97.7%.]

There are also given below the results obtained when disinfecting the sewage of Comp Merritt, N. J., by means of liquid chlorine, which results have been kindly supplied by Captain Paul Molitor.

These results are interesting in showing a comparison be-

BACTERIAL EXAMINATIONS OF SAMPLES OF SEWAGE AND RIVER WATER FROM CAMP MERRITT DISPOSAL WORKS. LABORATORIES OF HACKENSACK WATER CO.

Date	Bacteria per C. C.		48 hour count gelatine at 20°		B. Coli		In .001 C. C. inoculation.	
	Raw sewage	Final effluent	River water 500 ft. up stream from outlet	River water 500 ft. down stream from outlet	Raw sewage	Final effluent	River water 500 ft. up stream from outlet	River water 500 ft. down stream from outlet
12-10-18			870,000	1,300,000	Present	Present	Present	Present
12-26-18	1,410,000	120,000	90,000	200,000	Present	Present	Present	Present
12-31-18	1,240,000	10,000	20,000	40,000	Present	Absent	Present	Present
1-2-19	880,000	40,000	100,000	84,000	Present	Present	Present	Present
1-7-19	1,000,000	313,000	9,000	129,500	Present	Present	Present	Present
1-21-19	970,000	20,000	170,000	40,000	Present	Present	Present	Present
1-28-19	1,040,000	18,000	5,000	8,000	Present	Present	Present	Absent
2-4-19	1,860,000	1,000	1,400	3,500	Present	Absent	Present	Present
2-11-19	2,640,000	7,000	20,000	48,500	Present	Present	Present	Present
2-18-19	1,550,000	4,000	4,500	4,950	Present	Absent	Present	Absent
2-26-19	1,880,000	1,500	46,000	55,000	Present	Absent	Absent	Present
3-4-19	1,590,000	500	4,000	1,300	Present	Absent	Absent	Absent
3-11-19	1,530,000	400	2,000	3,000	Present	Absent	Absent	Absent
3-18-19	1,770,000	1,550	1,900	1,200	Present	Absent	Present	Absent
3-25-19	1,960,000	850	2,350	2,400	Present	Absent	Absent	Absent

River water samples were taken from tide water below dams of Hackensack Water Co. G. R. Spalding, Bacteriologist.

from the city flows through a long trunk sewer before reaching the settling basins and as it is known that there is considerable leakage into the sewerage system, it is probable that these conditions account for the small variation between the average and maximum flows.

In the remodeled plant the contact beds and tidal basins were practically abandoned, being of very little value in treating the daily flow of sewage. The disinfecting apparatus was arranged so as to disinfect the settled sewage in the aerating chamber, permitting about ten to fifteen minutes contact after the addition of the chlorine until it was discharged into the outlet. The apparatus used was the manual control, direct feed chlorinator as manufactured by the Wallace and Tiernan Company.

The sedimentation tanks are four in number, each compartment having the following dimensions along and to the water surface: Length, 76 ft. 6 in.; width, 15 ft. 6 in.; depth, 6 ft. 0 in. The tanks contain no baffles, with the exception of shallow surface boards. The sewage enters each compartment through two pipes at the water elevation.

The results of the treatment, supplied to the writer by Newton C. Wade, city engineer of Millville, show that, with few exceptions, since the remodeling of the plant and the use of disinfecting agents the bacterial removal has been adequate for the protection of the shell fish for the months of March, April, May, June, July and part of August, 1918. [The author

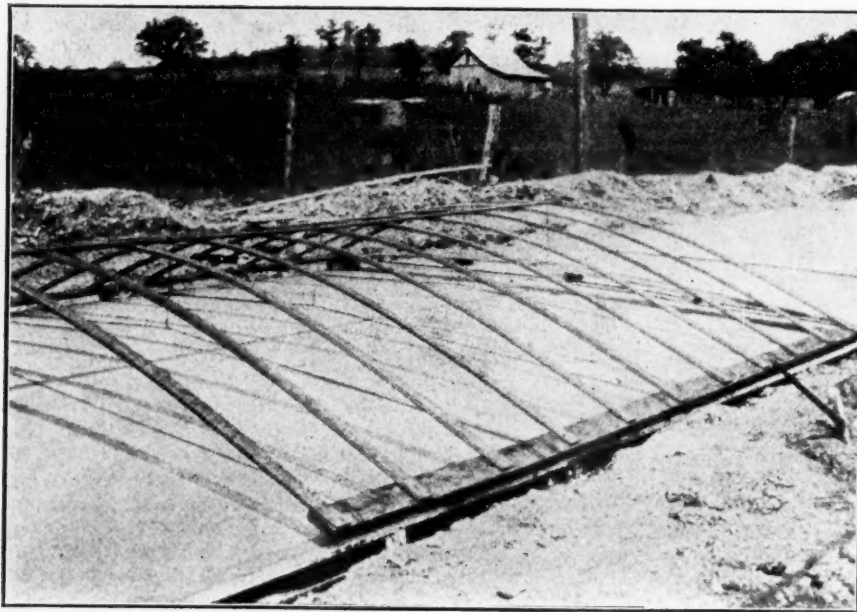
tween the B. Coli contained in the river water 500 feet above the sewer outlet and 500 feet below the sewer outlet.

In all cases where sewage sterilization plants are installed, it is well to bear in mind that the amount of chlorine to be used can only be satisfactorily determined by actual tests made upon the sewage to be treated, as the amount of chlorine required for sewages of different character varies through very wide limits.

### PROTECTING CONCRETE PAVEMENTS DURING SETTING.

A light, portable frame to be used in protecting concrete pavements immediately after construction has been devised by G. J. Lynch, of Reagan & Lynch, contractors, of Uniontown, Pa. This can easily be constructed at small expense by any contractor, using materials readily obtainable.

The protecting material is canvas, as in most of such devices, the novel feature being the frame which supports it. This consists of a series of ribs of one by four-inch boards, spaced two feet apart, their ends nailed to two by six-inch longitudinal runners. A one by four-inch continuous strip of wood was nailed to the centers of the ribs to keep them at uniform spacing. A sawhorse three or four feet high was set



FRAME TO SUPPORT CANVAS, FOR PROTECTING CONCRETE DURING PERIOD OF HARDENING.

in the center of a completed stretch of road, the ribs laid across this, their ends bent down until they touched the sides of the road, and fastened in this position by a bow-string of wire attached to the longitudinal runners. Another

or costs per square yard of 1.9 cents and 0.475 cent respectively. The total cost of 200 feet of frames was \$78 for material and \$24 for labor. The frames therefore paid for themselves when 7160 sq. ft. of pavement had been laid.

short piece of wire was stretched vertically between the center of each of these wires and central top strip.

The work of attaching these wires was performed as follows:

The wire was attached to one side by winding it around a cleat securely nailed in place. In order to spring the other side into position, a crowbar was used. The wire was wrapped around a cleat and then attached to the bar, which was used as a lever until the wire was taut enough and the cleat had been nailed down. This was continued until all horizontal wires had been placed. Cleats 2 by 6 by 12 inches were placed under the side braces at intervals of 4 feet, to facilitate handling. Eight of these supports were made in units 25 feet long.

Before these frames were used, eight men and a foreman worked an hour in shifting 200 feet of canvas. With these frames, the shifting is done in 15 minutes; the cost of the former, three shifts a day, being \$11.40, and of the latter, \$2.85;

## FOUNDATIONS FOR PAVEMENTS

### Macadam Base Preferable to Cement Concrete for Brick, Bituminous Concrete and Other Kinds of Wearing Surface—Opinions of Four Speakers at the A. S. M. I. Convention.

Four of the authors of papers discussing paving matters which were presented before the American Society for Municipal Improvements at New Orleans expressed the opinion, either directly or indirectly, that under certain conditions a cement concrete base not only was not necessarily the best for a given pavement, but might even be less desirable than a less rigid base such as bituminous concrete or macadam.

One of the papers referred to was written with the purpose of expressing this opinion, this being one by George C. Warren entitled "Foundations for Warrenite-Bituminous Pavements and Roads." Another, by Will P. Blair, treating of the "Economy of Brick Street and Road Construction," introduced the same idea as one of its principal features; Major E. A. Kingsley, in discussing "Roads in France and America," laid emphasis on the same point; while Frederick A. Reimer, county engineer of Essex county, New Jersey, in presenting traffic records covering four years taken on a number of roads in that county, illustrated by certain of these records the satisfactoriness of such foundations. The several papers and parts of papers referred to are abstracted in the following paragraphs.

Mr. Blair said that out of a study of the action of brick pavements had "grown the belief that a rolled broken-stone base will so perform a drainage function as to stabilize soil support and at the same time afford sufficient voids that frozen moisture content will cause but little expansive force," and therefore that a broken stone base practically eliminates the injury from frost action that is occasioned by such action even when cement concrete bases are used. "An added assurance against injury is the employment of an asphalt filler, which possesses qualities of adhesion and cohesion sufficient to hold the brick in place and yet afford a yielding quality which results in an adjustment and re-adjustment following any expansive force. Therefore, a combination of the two—a rolled broken-stone base and an asphalt filler—protects against injurious effects in a most wonderful way. These qualities, thoroughly understood, combine an element of economy so

great that it may be regarded as real progress in economy of brick road construction."

Major Kingsley said in his paper: "The Tillson-Lewis report reads: 'Happily, most of the French roads will make excellent foundations to which it will be sufficient to apply appropriate wearing surfaces.' No hint or suggestion is made as to tearing up the old macadam that it may be replaced with an expensive foundation for the 'appropriate wearing surfaces.' No more is there necessity in very many instances in our own country for tearing up well-built gravel, water-bound macadam, or even bituminous surface-treated macadam to put in new foundations. Thousands of dollars per mile upon thousand of miles of thoroughfares can be saved to the property owners by intelligent use instead of destruction of the work already done and the expenditure already made.

"The writer, to conserve a fast disappearing city bank balance, in 1916 paved several streets in San Antonio, Tex., by using as foundations old macadam roads. The macadam was made perfect in surface, after which a two-inch asphaltic pavement was laid. No defects have been noted in any of this work and much pavement in San Antonio has since been laid in the same manner. Some of the older of these pavements are in the down-town district and subjected to considerable heavy traffic. . . .

"Cement concrete is not desirable nor required where a macadam road is built and will answer for foundation purposes. And yet there are many cases where the macadam will not answer and concrete foundations should be used. . . . \$800,000,000, it is estimated, has already been spent in the United States on water-bound macadam and gravel construction. . . . The hundreds of millions saved by utilizing good macadam for foundations will build thousands of miles of additional roads."

Mr. Reimer, in presenting traffic data collected on Essex county roads, reduced the traffic total tonnage to tons per foot of width and tons per foot using the ten-foot strip on each side



of the trolley track, each of these being given for each of the years 1916, 1917, 1918, and 1919. The pavements where the traffic records were taken consisted in two cases of  $2\frac{1}{2}$ -inch bituminous concrete on a 6-inch concrete base, in two cases of 5-inch granite block on a 6-inch concrete base, in one case of asphalt block on a 6-inch concrete base, in one case of  $2\frac{1}{2}$ -inch bituminous concrete on a  $9\frac{1}{2}$ -inch telford macadam base, and in the seventh case of 2-inch bituminous concrete on a  $9\frac{1}{2}$ -inch telford macadam base.

The first of the two on telford base had a double trolley track in the center, and in 1919 the tons traffic using the ten-foot strips outside of the track was 507.54 per foot width for the year, while the highest tonnage similarly calculated for any of the roads on a concrete base was 391.17. The second of the two roads on telford base had a 24-foot roadway and the travel over it was comparatively light, amounting to 86 tons per foot of width in 1919. Of the former of these two roads on telford base, which carried a much heavier traffic than any other road in the list, Mr. Reimer reported: "There is absolutely no evidence of this pavement creeping under the traffic carried in 1919," while the two pavements with  $2\frac{1}{2}$ -inch bituminous concrete on a 6-inch concrete base "have shown a marked tendency to creep under the large increase of traffic using same." Concerning the other pavement made of bituminous concrete on a telford base, but carrying a much lighter traffic, Mr. Reimer reported that it "is apparently in more perfect condition today than four years ago."

From his experience he concludes that "given an old telford macadam foundation from eight to ten inches in thickness, with the subsoil thoroughly drained, a bituminous concrete surface not less than two inches in thickness will economically carry both light and medium traffic." Light traffic he defines as not exceeding 150 tons per foot of width of roadway travel, with the combined weight of vehicle and load not exceeding fifteen tons; while medium traffic would lie between 150 and 300 tons per foot of width of roadway travel, with the same limit of combined weight of vehicle and load.

Mr. Warren went into the subject much more exhaustively, devoting his entire paper to it, and some of the principal points which he made are as follows.

The essential requirements of a pavement foundation are resiliency and strength. These may be mutually exclusive and the engineer must adjust a compromise between them depending upon the requirements of each particular road. Only less important is a union between the base and the surface as close as is practicable with due consideration to the other factors.

Strength Mr. Warren considers less important than resiliency; in fact, he believes that "extreme strength of foundation, which necessarily includes rigidity, is actually detrimental under many if not most conditions of subsoil and drainage."

Resiliency can be given first place where the natural or artificial drainage is adequate and the subsoil is of such character that it can be rolled to a reasonably solid condition, and where the wearing surface is a stable, monolithic, resilient pavement. "On the other hand, if a road or pavement sub-base is in poorly drained or weak subsoil, strength of base with its attendant evil of rigidity is a controlling factor for consideration."

The highest degree of tensile strength and its attendant rigidity necessarily carry with them the certainty of more or less cracking from contraction and heaving from expansion under climatic changes. Serious cracks in a pavement foundation will cause corresponding cracks in the wearing surface.

The cracking is immediately followed by serious wearing of the edges of the cracks under normal traffic.

If we want to break a surface with the blow of a hammer, we would place it on a rigid, solid stone or anvil, knowing that if we should place the substance on a piece of rubber (which is the acme of resiliency) the blow would have no effect whatever. So in a pavement surface, if other conditions, including drainage, subsoil and character of wearing surface, make the use of a resilient base practicable, then the wear and tear on the wearing surface under the blows of traffic are vastly less than if laid on a rigid base.

#### OLD MACADAM AS BASE.

Macadam roads, whether of crushed stone, gravel, slag or oyster shells, are resilient and still solid enough to hold the

weight of traffic, as distinguished from the motion of traffic. There are in existence today macadam roads costing millions of dollars which, as a wearing surface, would not sustain the traffic of modern motor vehicles, but which if not removed would provide an economic base either in whole or, if worn too thin, with proper surface addition of new metal.

Mr. Warren reports that in his experience this has been demonstrated by fifteen years of successful results in more than one hundred municipalities and under all the widely varying climatic conditions of the United States and Canada, such use amounting to over 8,000,000 square yards. He cites as instances Highland avenue, Birmingham, Ala., laid in 1904; Michigan boulevard, Chicago, laid in 1907; Columbia River highway, Oregon, laid in 1915, and others. On Michigan boulevard a traffic record taken August 16, 1907, gave a total number of vehicles of 2,908, which had increased to 20,204 on September 2, 1919. (It is interesting to note that in 1907 there were 1,024 horsedrawn vehicles, while the 1919 record gives only 25.)

Where an old macadam surface is so used, it should be disturbed as little as possible, which may be effected by humoring the grade and as closely as practicable following the old established grade, merely knocking off the humps and using the material to fill the depressions. On country roads particularly, regardless of the type of old construction or of new foundation or wearing surface, the best practice is merely to level off and build up on the old grade. On country roads raising the grade a few inches not only does no harm but may improve the drainage at reduced cost of construction.

"It should be borne in mind that the integrity of the old road bed should be carefully proved by test holes or still better by test trenches across the road at frequent intervals. If such test develops a depth of say six inches or more of well compacted crushed stone, gravel, slag or oyster shells, with the coarse aggregate predominating, it is safe to say that the foundation is adequate for such a stable, dense monolithic water-proof surface as we are discussing. If such tests show a deficiency of such old metal, then there is still enough of any old material to make its conservation most economic for reinforcing by the addition of a more or less varying depth of new metal."

#### NEW BROKEN STONE BASE.

Mr. Warren also advocates building new base of broken stone, emphasizing the importance of drainage and compression of the subgrade. "With a well-drained, well compacted subgrade, there need be no question of the sufficiency of a well-laid, compressed stone base, under most traffic and climatic conditions."

"It is desirable that the lower portions of the base be of as large stone as local conditions permit. If crushed stone is used, it is desirable that the largest particles be as large as three or four inches in diameter. If economically available, it is desirable to lay a lower course of quarry or filled stone, preferably slabs, about four inches thick, laid on the flat side.

... The large stone should be supplemented by the laying of a sufficient quantity of new smaller stone to provide the desired depth and contour, and the whole compressed with a heavy roller until a sound base, which will not creep or compress under further rolling, is provided. Under the extremely heavy traffic of war conditions in France and Belgium, it was found that rather flat stone as a lower course and a total of eight to nine inches of metal would sustain the weight of the immense motor truck and artillery traffic, but without an additional substantial wearing surface it would not long sustain the motion of traffic."

This type of base with warrenite-bitulithic surface has been used successfully for over 12,000,000 square yards during the past eighteen years, and over 3,000,000 had been under construction and contract in 1919. Some of this may be found in nearly every city and county of Oregon, 2,000,000 square yards having been laid in Portland since 1903. All of this type of pavement that has been laid in Oregon is on what Mr. Warren calls "resilient base"—either old macadam, new compressed stone, or dense bituminous concrete. In Salt Lake City and other parts of Utah there are over 200,000 square yards, part of this having a base composed of iron furnace slag in place of crushed stone. The celebrated Orange Grove avenue in Pasadena was laid on a compressed stone base nine

years ago, has had no repairs in the meantime, and the contom is still in perfect condition.

#### BITUMINOUS CONCRETE BASE.

Dense bituminous concrete has been used by Mr. Warren during the past seven years for over 3,000,000 square yards of pavement in more than fifty municipalities, and he claims that there is no type of foundation which as a whole has resulted in so nearly absolutely and uniformly successful results. This he attributes to the fact that, in addition to the resiliency of the macadam base, the bituminous surface unites perfectly with the bituminous base because both courses are of the same character, and there is therefore no possibility of the displacement of the surface. The total depth of base and wearing surface ranges from four to five inches.

In the far west, where bituminous materials are comparatively cheap and where clean, sound gravel is economically available, such construction has been made at lower cost than is possible with an adequate depth of rigid portland cement concrete base. In the east, however, under the past low prices of cement, cement concrete base has had the advantage in the first cost, and consequently very little bituminous concrete base has been laid in the east. Under the present uniformly high cost of portland cement, however, in many if not most places the dense bituminous concrete base construction is now generally as low as if not lower than the portland cement concrete base. This type of base has been used in Oregon, California, Arizona, Idaho, Utah, Montana, Washington, Wyoming and British Columbia. The U. S. Army Department and the U. S. Bureau of Public Roads adopted dense bituminous concrete base on all of the principal roads of Camp Lewis, Washington, totaling about 500,000 square yards. The wearing surface was warrenite-bitulithic and local bank gravel was used for both wearing surface and base, and Mr. Warren claims that no cantonment roads of any type whatever have proved so uniformly successful under the vigorous traffic of army cantonments as these roads in Camp Lewis.

#### NEW SAN FRANCISCO STREET SIGNS.

San Francisco needs more and better street name signs, and, with a view to meeting this need, the Engineering Department turned over to one of its employes, R. S. Woodward, the work of designing a sign for general use. The



NEW STREET SIGNS IN SAN FRANCISCO.

sign which he evolved is shown in the accompanying illustrations.

At each street corner where there will be two double-faced signs, one for each street. Each sign consists of a strip of Armco steel 20 by 4 inches. This is given one paint coat and two base coats, and the letters are put on with two coats. The base color is yellow and the letters black; yellow being striking because few surrounding colors are yellow, while black contrasts strongly with the yellow background. The signs are set about 9 feet above the ground.

Most of the signs are on a standard made of four feet of three-inch pipe, a reducer, and six feet of two-inch pipe. The bottom is set one foot into a concrete base. The three-inch pipe is painted black, the smaller pipe yellow, and the cap black. For fastening the sign to the standard, a piece of angle iron is brazed in a horizontal position onto a cap which screws onto the top of the standard. There are two holes in this angle iron and corresponding ones in the bottom of the sign, and short bolts fasten the sign to the angle. The second sign is fastened on top of the first in the same way, by means of an angle iron bolted to the top of the lower sign, another to the bottom of the upper sign, and these two angle irons being brazed together. Ordinarily the signs are fixed at right angles to each other, but where the streets intersect at a different angle, the angle irons are brazed together at the same angle.

In some cases the signs may be fastened to existing wooden telegraph or trolley poles, when a bracket will be used to hold them out from the pole so that they can be seen in both directions. Such a bracket is shown by one of the photographs.

#### PAINTING IRON AND STEEL STANDPIPES.

Information from All Sections of the Country—Kind, Amount and Cost of Paint Used—Preparatory Treatment—Results.

A paper on this subject by Charles W. Sherman was published in our issue of November 1, in which reference was made to data collected and tabulated by him. These data are given in the accompanying tables.

Several cities contained in the author's table have been omitted because the information given was incomplete. These were as follows:

Amityville, N. Y.: constructed 1892; iron; 20 by 125 ft.; no tower or roof; ground water; painted 2 coats when erected; in 1914 painted for 51 ft. down from top, wire brushed, one coat of graphite.

Brookville, Pa.: two constructed about 1894; steel (?); 20 by 24 ft.; tower, no roof; surface water, filtered, with alum and hypo.; not painted since erection. Also two erected in 1902; steel, 20 by 24 ft.; tower, no roof; same water; not painted since.

Canton, N. Y.: Constructed 1889; steel; 20 by 72 ft.; no tower or roof; soft surface water; "do not paint interior."

Circleville, O.: Constructed 1886; iron; 22 by 150 ft.; no tower or roof; hard water; nothing about painting known to present authorities.

Conneaut, O.: Constructed 1888; iron; 20 by 120 ft.; no tower or roof; soft water, filtered, with alum; no record of interior painting; outside painted 1888, 1902, 1915, 1916, one coat each time.

Dayton, O.: Constructed 1913; steel; 41 by 85 ft.; roof, no tower; hard ground water; not painted since construction and kind used then not stated.

Fall River, Mass.: In addition to data given, first standpipe painted in 1889, 1893, 1900 and 1903; no data given.

Hamilton, N. Y.: Constructed 1895; iron; 30 by 38 ft.; tower, no roof; ground water, medium, filtered; no data as to painting.

Knoxville, Tenn.: Constructed 1894; steel; 32 by 85 ft.; painted in 1900 with "various kinds."

Manchester, Mass.: Constructed 1892; 35 by 75 ft.; roofed; painted in 1894 with ebonized varnish.

Mattapoisett, Mass.: Constructed 1913; iron (?); 25 by 90 ft.; roof, no tower; soft ground water; when constructed given two coats, material not known.

Merrimac, Mass.: Constructed 1904; 40 by 45 ft.; roof; painted 1904, 1905, 1906 and 1910; no data.

Millville, N. J.: Constructed 1878; iron; 12 by 128 ft.; no tower or roof; no data known.

Spokane, Wash.: second tank constructed 1908; steel; 30 by 70 ft.; no tower or roof; hard ground water; kind of paint not stated.

(To be continued.)



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Place.	Date of Construction.	Material.	DIMENSIONS.		Character of Water.	Character of Water.
			Diam.	Height.		
Asbury Park, N. Y.	1888	Iron	12	125	Ground	River; hard; filtered; cl.; alum
Atlantic City, N. J.	1882	Iron	25	132	Ground and surface; soft	Alum; chlorine
Atlantic City, N. J.	1888	Iron	15	140	Ground and surface; soft	Surface; soft
Baldwinsville, N. Y.	1889	Iron	20	50	Ground; hard	Surface; soft
Baltimore, Md.						
Roland	1905	Steel-tr	24	92.5	Surface; soft; filtered and alum	Surface; soft
Arlington	1898	Steel-tr	25	95	Surface; soft; filtered and alum	Surface; soft
Bangor, Me.	1896	Steel-tr	75	50	Filtered and alum	Surface; soft
Barnegat, N. J.	1909	Steel-tr	20	20	Artesian; soft	Surface; soft
Belfast, Me.	1887	Iron	30	45	Filter and soda and alum	Surface; soft
Belmar, N. J.	1908	Iron	18	125	Artesian; soft	Surface; soft
Biddeford, Me.	1866	Steel	60	50	Soft; filtered and alum	Ground; hard
Billerica, Mass.	1898	Iron-r	25	118	.....	Ground; hard
Boston (Metrop. W. W.)						
Forbes Hill	1902	Steel-tr	30	64.3	Surface; soft	Ground; hard
Arlington	1894	Iron-r	40	60	Surface; soft	Ground; hard
Bellevue	1914	Steel-tr	100	44.3	Surface; soft	Artesian
Brewer, Me.	1904	Steel	30	106	Surface; sand filter	Soft; filtered; alum
Bridgton, Me.	1903	Steel	35	55	Surface; soft	Surface; soft
Bristol, Conn.	1901	Steel	30	35	Soft	Surface; soft; cl.
Bristol, R. I.	1908	Steel-r	40	50	Surface; soft	.....
Brockport, N. Y.	abt. 1891	Steel	20	75	Ground; filtered and alum and soda; Ground; hard	Lake; soft
Brookton, Mass.	1890	Iron?	62	60	.....	River; flt.; cl.
Burlington, N. J.	1887	Iron	20	120	River; filtered & alum & hypo.	River; flt.; cl.
Cape May	1902	Steel-r	25	135	Artesian; hard	River; flt.; cl.
Carthage, N. Y.	1887	Iron	25	75	Soft; spring	Ground; hard
Cortland, N. Y.	1911	Ingot iron	60	50	Hard	.....
Dayton, Ohio	1916	Steel-r	42	90	Ground; hard	Surface; soft
Delaware, Ohio	1888	Iron	20	160	Ground; med.	Surface; soft
Duluth, Minn.	1913	Steel-r	22	27	Ground; soft	Surface; soft
Eagles Mere, Pa.	1914	Steel-r	22	27	Surface; soft, hypo.	Surface; soft
Elmer, N. J.	1902	Steel-r	11-5/12	100	Surface; soft	Surface; soft; filtered
Exter, N. H.	1912	Steel	12	110	Soft; "best in state"	Surface; soft; filtered and alum
Fairport, N. Y.	1886	.....	52	60	.....	Ground; hard; filtered; lime; sulph. iron, alum, chlorine
Fall River, Mass.	1893	Steel	26	75	Hard	do.
.....	1886	Iron	73 x 34	.....	Med.; surface	do.
.....	1892	.....	65 x 56	.....	Surface; soft	Surface; hard; hypo.
Falmouth, Mass.	1903	Iron-r	35	30	Surface; soft	Surface; soft
Fosteria, Ohio	1892	Iron	20	85	Surface; soft	Surface
Foxborough, Mass.	1891	Steel-t	25	100	Surface; soft	Surface; filtered; lime; sulph. iron, alum, chlorine
Framingham, Mass.	abt. 1890	Iron-r	20	125	Surface; soft; filtered	do.
Franklin, Mass.	1886	.....	40	81	Ground	Surface; hard; hypo.
Grand Rapids, Mich.	1886	Iron	37	80	Mixed	Surface; soft
Highlands, N. J.	1907	Steel-tr	50	60	Filtered alum and hypo.	Ground; hard
Hingham, Mass.	1883	Steel	30	30	Soft; filtered	Ground; hard
Hyannis, Mass.	1883	Iron-r	40	57	.....	Ground; hard
Jackson, Ohio	1912	Steel-r	25	100	Ground; soft	Surface; hard
Jamesburg, N. J.	1900	Iron	30	50	Ground	Ground; soft
Jenkintown, Pa.	1907	Wrought	16	65	.....	Hard; filtered sulph. iron, lime; hypo.
.....	1912	Wrought	28	127	.....	Surface; cl.
Lancaster, Pa.	?	Iron?	60	65	Filtered and alum and hypo.	River; filtered; alum
Lewisburg, Pa.	1897	Steel	25	110	Filtered; chlorine & alum	River; med.; filtered; alum
Marion, Mass.	1907	Iron	15	130	.....	Surface; soft; filtered; alum; cl.
Marlboro, Mass.		.....	20	100	.....	Surface; soft
Matawan, N. J.	1895	Iron-r	30	35	Surface	Surface; soft
Medford, N. J.	1903	Iron	12	115	Soft; filtered	Surface; soft
Media, Pa.	1893	Iron	12	100	.....	Surface; soft
Middleboro, Mass.	1885	Iron	35	35	Surface; soft; filtered; cl.; alum	Surface; soft
Millis, Mass.	1891	Iron-r	20	103	Hard	Surface; soft
Milwaukee, Wis.	1886	Steel-t	20?	100	.....	Surface; soft
.....	1874	Steel-t	15	173	.....	Surface; soft
.....	1874	Steel-t	4	125	.....	Surface; soft

t—with enclosing tower. r—with roof. Neither of these present if not so indicated.

## Summary of Reports on Painting the Interior Surfaces of Standpipes

Place	Date Painted	Preparation	No. of coats	Kind of Paint	Amount and Cost, Including Applying	Condition of Standpipe
Asbury Park, N. J.....	1916	S W	2	Dixon's graphite	53 gals., \$200	
Atlantic City, N. J.....	1905	S W	2	Mineral rubber		Good, but needs painting in 1917.
Atlantic City, N. J.....	1905	S W	2	Mineral rubber		Good; needs painting in 1918.
Baldwinsville, N. Y.....	1889	S W	1	Graphite		
	1914	S W	1	Graphite	10 gals., \$20	
Baltimore, Md.....	1912	W	..		\$195	
Baltimore, Md.....	1912	W	..		\$315	
Bangor, Me.....	1896**	W	2	Harrison's Antoxide	76 gals., \$369	
Barneget, N. J.....	1914	S	1	"Hot dressing"	\$100	
Belfast, Me.....	1887	..	3	Asphalt		
	1903	..	2	Graphite elast.		Very badly rusted on lower sheets
Belmar, N. J.....	1908	..	2	"Ordinary"	25 gals.	
	1916	W	2	Red lead and B. oil	25 gals. (650 lbs. red lead) \$550	
Brideford, Me.....	1912	S W	..	Graphite		
	1916	..	2	S & W metallistic	55 gals., \$507*	
BillERICA, Mass.....	1906	..	2	Carb. coating		
Boston-Forbes Hill.....	1902	..	1	Red lead	\$427*	
		..	2	Gilsonite		
	1912	..	3	Red lead	\$430*	
Boston-Arlington .....	1906	..	1	Red lead	\$425*	
		..	2	Gilsonite		
	1911	S W	same	same	\$475*	
Boston-Bellevue .....	1915	B	3	Red lead		
Brewer, Me.....	**	..	2	Smith's Durable metal coating	1 bbl. (labor, \$75)	
Bridgton, Me.....						Not painted since erection
Bristol, Conn.....	1912	..	..		Labor, \$83; paint \$62	
Bristol, R. I.....	1908	..	2	Asphalt	90 gals.	
Brockport, N. Y.....	1915	W	2	Dixon's graphite	65 gals., \$265*	
Brockton, Mass.....	1904	S W	1	Asphalt	30 gals., \$90	
	1908	S W	1	Asphalt	30 gals., \$95	
Burlington, N. J.....	1915†	S W	2	Red lead in oil	About \$300*	
Cape May, N. J.....	1905	..	1	Cement wash		
	1913	S W	1	Red lead in oil		
	1916	S W	1	Red lead in oil		Condition fair before painting
Carthage, N. Y.....	1898	W	1	Graphite	\$100*	
	1908	W	1	Graphite	\$125*	
Cortland, N. Y.....	1911	..	2	Sherwin-Williams		
	1914	W	1	Dixon's graphite	40 gals., \$60; labor, \$37	
Dayton, O.....	1917	..	2	Low Bros. Iron Shield		Good work
	..	..	2	Low Bros. Iron Shield		
Delaware, O.....	1885?	..	2	Dixon's graphite		
	1914	S W	2	Goheen carbon coating	25 gals., \$150	
Duluth, Minn.....	1913	..	1	Red lead (shop)		
		..	1	Graphite (field)		
	1914	..	same	same		
Eagles Mere, Pa.....	††	S W	1	Dixon's graphite	15 gals., \$100	Used summers, drained in winter.
Elmer, N. J.....	1915	S	1	Asbestos	52 gals., \$90	
Exeter, N. H.....	1886	..	3	Asphalt		
	1895	..	1	Asphalt		Lower rings quite badly rusted.
	1902	..	2	D. M. C.	53 gals., \$178*	Rusted and lower rings quite badly pitted.
	1907	..	2	Chrysolite		
Fairport, N. Y.....	1906	..	1	Graphite		No other record.
	1913	..	1	Graphite	\$70*	
Fall River, Mass.....	1886	..	3	Asphalt		
	1897	..	..	Asphalt		
Fall River, Mass.....	1897	..	..	Asphalt		
	1902	..	..	Graphite		
	1908	B	..			
Falmouth, Mass.....	1914	S W	2	Det. graphite	\$1,296†	
Falmouth, Mass.....	1916	..	1	Lucas metalife	26 gals., \$68.50*	
Fostoria, O.....	†	S W	1	Asphalt	30 gals., \$60	
Foxborough, Mass.....	1916	..	2	Det. graphite	\$165	
Framingham, Mass.....	1911	..	..		Total, \$306	
Franklin, Mass.....	1910	..	2	Graphite	40 gals.	
	1916	T S W	2	Dixon's graphite	40 gals., \$200*	
Grand Rapids, Mich.....	1915	S W	1	Patterson-Sargent Co.'s "no-croc"		
		..	1	Patterson-Sargent Co.'s gas-holder black		
Highlands, N. J.....	1912	S	2	Asphalt		
Hingham, Mass.....	1913	..	2	Asphalt	65 gals., \$299	
	1915	S W	2	Red lead (Met. W. Bd.)	35 gals., \$548†	
Hyannis, Mass.....	1912	..	2	"Patent"		
	1915	S	2	Red lead	About \$100*	Very little sign of original paint
Jackson, O.....				Never painted since built.	Cleaned about every 2 yrs.	Not badly corroded.
Jamesburg, N. J.....	1912	S W	..	Dixon's graphite		
Jenkintown, Pa.....	1908	C D	1	Main's hot coating		Looks as good as day it was put on. "No limit to wear"
Jenkintown, Pa.....	1912	C D	1	Main's hot coating		
Lancaster, Pa.....	1904	C	2	Graphite	72 gals., \$145	
	1911	C S	2	Graphite	85 gals., \$165	
	1915	W	1	Graphite	39 gals., \$186	
Lewisburg, Pa.....	1911	W	1	Red lead	\$190	
Marlboro, Mass.....	1895	..	2	Asphalt		All gone in 3 years
	1898	..	2	Paint		All gone in 3 years
	1902	..	2	Paint (another kind)		Hanging in shreds in 3 yrs.
	1905	..	2	Paint (still another kind)		No trace left in 4 yrs.
	1912	..	1	Red lead		Record to 1912 only
		..	2	"Paint"		

\*Includes outside. † not including paint. ‡ not including labor.

Reconstructed 1916. § None lasted over two years. ‡ Painted every two years. \* \* Painted every 4 years.

††Painted every six years.

B-sand blasted. C-cleaned. D-dried. H-chip hammered. L-light brushing. S-scraped. T-washed with turpentine. W-wire brushed.

(To be continued)



# THE WEEK'S NEWS

Indiana Gas Rates Based on Heating Value—Power to Raise Rates by New Jersey Commission Upheld by Court—Police and Firemen and Unions in Pueblo, Colo.; Boston, and Jersey City—City Manager Plan Adopted in Lima, O., and Newport News, Va.—Zone Fare Plan in New Jersey—Toledo without Street Car Service—Big Improvements for Chicago and Seattle.

## STREET LIGHTING AND POWER

### Gas Rate Varies with Heating Value.

Indianapolis, Ind.—The proposed new rules for Indiana gas companies promulgated by the joint effort of the Indiana Gas Association, the Bureau of Standards, the state commission and the Municipal League, provides in Rule 16 for a heating standard of not less than 540 B. t. u. The average requirement proposed is 570 B. t. u. The proposed rule has this feature: "When the utility is unable to maintain the standard heating value, the consumer shall be billed at the legal rate when the total B. t. u. content averaged for the calendar month does not fall below 560." When the heating value falls below 560 B. t. u. the following schedule of rates is proposed:

560 B. T. U. and more, 100 per cent of standard rate.  
From 560 B. T. U. to and including 550 B. T. U., 98 per cent of standard rate.  
From 550 B. T. U. to and including 540 B. T. U., 96 per cent of standard rate.  
From 540 B. T. U. to and including 530 B. T. U., 94 per cent of standard rate.  
From 530 B. T. U. to and including 520 B. T. U., 92 per cent of standard rate.  
From 520 B. T. U. to and including 510 B. T. U., 90 per cent of standard rate.  
From 510 B. T. U. to and including 500 B. T. U., 88 per cent of standard rate.  
From 500 B. T. U. to and including 490 B. T. U., 86 per cent of standard rate.  
From 490 B. T. U. to and including 480 B. T. U., 83 per cent of standard rate.  
From 480 B. T. U. to and including 470 B. T. U., 80 per cent of standard rate.  
From 470 B. T. U. to and including 460 B. T. U., 75 per cent of standard rate.  
From 460 B. T. U. to and including 450 B. T. U., 70 per cent of standard rate.  
From 450 B. T. U. to and including 440 B. T. U., 60 per cent of standard rate.  
From 440 B. T. U. to and including 430 B. T. U., 50 per cent of standard rate.  
From 430 B. T. U. to and including 420 B. T. U., 35 per cent of standard rate.  
From 420 B. T. U. to and including 410 B. T. U., 20 per cent of standard rate.  
From 410 B. T. U. to and including 400 B. T. U., 10 per cent of standard rate.

The above reduction in rates shall apply also to the minimum service charge or the readiness-to-serve charge when there is such a charge in the utility's standard schedule of rates. In computing the monthly average total heating value to determine the per cent of standard rate to be charged the consumer, the utility will not be permitted to use any values in excess of 600 B. T. U.

### Commission's Rate-Raising Power Upheld by Court.

Trenton, N. J.—The State Supreme Court of New Jersey has handed down a decision upholding the right of the Board of Public Utility Commissioners to allow an increase in the power rates of the Public Service Electric Co. The case in question was brought by the Edison Storage Battery Co., West Orange; Snead & Co., iron works, Jersey City; Crucible Steel Co., Harrison; Independent Lamp & Wire Co., Weehawken, and the Bound Brook Oilless Bearing Co., Bound Brook, these plaintiffs contesting the authority of the commission to allow a 25% surcharge for power service to industrial consumers. This order of the board was made on July 16, 1918, and the rates allowed were to apply to electric energy supplied after Feb. 1, 1918, at which date the company had submitted a revised schedule of charges to the board as a war measure. The industrial plants contended that they had contracts with the utility company covering a period later than the time noted (Feb. 1, 1918) which fixed the rates at a lower sum than that allowed by the board, and this, it was held, im-

paired the obligation of their contracts in violation of constitutional rights. In its decision the court said: "Private contracts as to rates to be charged for furnishing electric power must yield to public welfare, and the state may fix a just and reasonable rate without regard to that reserved in the contract. Whether the Utility Commissioners are required to determine private rights, arising on contracts, in fixing rates for the public good, and to discriminate between those of the public who have contracts and those who have not, and otherwise make a discrimination according to agreements between citizens, or whether their orders should be general as to all who are within the class affected, we are not required to pass upon this case, although inclined to the opinion that such orders should be general, leaving the contracting parties to settle their rights in an action raising that question in which they are parties and not by certiorari. The record sustains the findings of the Board that the rates fixed are just and reasonable and we being of opinion that the order properly relates to the initial proceedings changing the rates, and that private contracts must give way to public welfare when they conflict, if that question can be raised in these proceedings, the writs in all the cases will be dismissed with costs."

### Tacoma Plans 75,000 h. p. Hydroelectric Development.

Tacoma, Wash.—The city will be ready to make plans for hydroelectric development at the Lake Cushman power site, as soon negotiations are completed. Lake Cushman is an expansion of the Skokomish river, and the future plans contemplate the construction of a dam on the stream below the lake and thereby raising the water level of the lake about 60 ft. higher than the present level, and greatly increasing the capacity of the storage basin. Then, the plan is to convey water from a point above the dam through an open canal to a forebay from which it will be conducted through pipe lines and penstocks to the proposed power plant on Hood canal. This will give a head of about 580 ft. at the plant. Under this scheme it is expected to make possible the development of about 75,000 hp.

## FIRE AND POLICE

### Policemen Give Up Union Charter.

Pueblo, Colo.—The members of the police department have given up their American Federation of Labor charter. They gave no reason for dropping the charter, but hinted that they did not want to stir up any trouble with the city commissioners. The police department was unionized three months ago.

### Court Denies Reinstatement of Union Police.

Boston, Mass.—The state supreme court has denied the petition of the officers of the Boston Policemen's Union who sought restoration to the positions from which they were removed by commissioner Edwin Curtis, because of their affiliation with the American Federation of Labor. The court acted on the request of the former policemen, headed by John F. McInnis, president of the union, for a writ of mandamus to compel the commissioner to restore them. Judge Carroll held that they were not entitled to reinstatement because they had failed to avail themselves of remedies contained in the antio coercion act. It was the suspension of nineteen officers of the union by commissioner Curtis that precipitated the strike of policemen September 7. The patrolmen were tried by the commissioner on charges that they had violated a department rule by their

union membership and activities, and were found guilty. Sentence was withheld while union members announced openly that any punishment of their leaders would be met by a strike. Within a few hours of the union officers' suspension the other members of the union walked out.

#### Jersey City Suppressing Firemen's Union.

Jersey City, N. J.—Public service commissioner F. X. O'Brien is carrying out a sweeping reorganization of the fire department, which he declared had become demoralized, since it became unionized a short time ago, to such an extent that it was becoming a menace to the city. Not only did Mr. O'Brien transfer 97 men, admittedly with the intention in many instances of punishing them, but he restored fire drills as a disciplinary measure, threatened a wholesale shakeup of some 200 to 300 men unless there was quick reform, asserted that some of the leaders in insubordination would be tried and dismissed and proclaimed his determination to replace practically the whole force with ex-service men, rather than permit it to become "Bolshevik." Among the men transferred were two captains. "There will be dismissals. The men will have fair trials, but I will be the judge. I have evidence that convinces me of the insubordination and of disregard of orders and of one flat refusal to obey orders. There are three men who have been urging the others on. I know there have been secret meetings. I have never taken a cent of political contribution from the men of the department of which I am the head. I have aimed to make firemen and not contributors or statesmen or politicians."

#### Twenty-Five Cities Vote For Two-Platoon Plan.

Boston, Mass.—Twenty-seven cities and one town in Massachusetts voted at the recent elections on the question of the adoption of the two-platoon system for fire departments. Five cities—Boston, Malden, Melrose, Newton and Beverly—also the town of Brookline, defeated the plan; the others accepted it. In Boston those opposed to the two-platoon plan won by a margin of 5446, the vote being "yes" 37,605, "no" 43,051. The vote in the other cities was:

	Yes	No	Majority	No
Beverly	1,457	1,659	202	
Brookline	5,821	2,916	2,906	
Brookline	2,168	2,838	670	
Chelsea	2,513	1,164	1,349	
Chicopee	1,911	1,189	522	
Fall River	9,405	2,677	6,728	
Fitchburg	2,938	1,832	1,106	
Haverhill	4,312	1,942	2,370	
Lawrence	7,280	2,373	4,907	
Leominster	1,426	872	554	
Lowell	7,143	5,754	1,389	
Lynn	9,195	4,002	5,193	
Malden	2,467	3,623	1,216	
Melrose	1,030	1,899	869	
Methuen	1,216	655	561	
New Bedford	8,322	3,829	4,493	
Newton	2,447	4,138	1,691	
Northampton	1,802	1,167	635	
Peabody	1,423	943	480	
Pittsfield	4,286	1,141	3,145	
Quincy	3,254	2,418	836	
Revere	2,778	516	2,262	
Salem	3,129	2,758	371	
Somerville	6,609	3,948	2,661	
Springfield	9,179	3,167	6,012	
Taunton	2,733	1,498	1,235	
Worcester	15,250	4,885	10,168	

Fire Commissioner Murphy, in commenting on the result, said: "If the two-platoon system had been accepted by the voters of Boston it would have meant an annual increased expenditure of approximately \$400,000. Its adoption would have meant also the downfall of the present efficiency of the department. To establish the two-platoon system and still maintain the present efficiency of the department in numerical strength would mean the establishment of such a system as would cost the city of Boston \$600,000 a year. The officers of the department were opposed to the two-platoon system because they realized if it were accepted that the extra expense entailed would prevent their salaries from being increased. They have had no increase since 1914, and they feel that they deserve it. The men, a majority of them, have favored not only a two-platoon system but also an increase in their pay.

If both the two-platoon system and an increase in pay were granted to the men it would mean approximately an increase of \$1,100,000 yearly in the fire department alone." Mayor Peters, before the election, issued two statements to show how well the firemen had been treated in the last few years, and what the proposed system would mean financially to the city. He was seconded by the Finance Commission and the Good Government Association. The strongest argument against adoption of the two-platoon plan, in the opinion of the politicians, was not the increase to the tax rate which a maximum additional expense of \$600,000 would mean, but the mayor's statement that this additional outlay would jeopardize the interests of school teachers and other city employees, who are looking for generous salary advances next year, and thus constitute an injustice.

## GOVERNMENT AND FINANCE

#### City Manager Plan Adopted.

Lima, O.—The city approved the commission manager form of government by a safe majority at the recent election. Fifteen men were elected to write the charter under which the new government will operate.

#### Chicago Approves Big Bond Issues.

Chicago, Ill.—Big bond issues for carrying out the Chicago Plan were approved by good majorities at the recent election. The votes were as follows:

	For	Against	Majority
Western Avenue (\$2,400,000)	160,374	63,886	96,488
Ogden Avenue (\$5,400,000)	159,628	60,579	99,049
South Water Street (\$3,800,000)	160,160	61,443	98,717
Robey Street (\$9,200,000)	155,554	63,501	92,053
Ashland Avenue (\$5,800,000)	154,536	62,378	92,053
Michigan Avenue (\$2,000,000)	157,036	57,754	99,282

The non-partisan election law was approved by a vote of 119,017 for to 85,318 against, a majority of 33,636. The "fifty-ward" law got a bare majority of 856, the vote being 102,958 against 102,102. By a majority of 99,937 the votes favored a two-year term for the alderman, 149,441 voting for two years and 49,569 for a four year term.

#### Newport News Approves City Manager Plan

Newport News, Va.—Newport News voted for the city manager plan of government by a majority of more than 4 to 1 at the recent election. The plan provides for a city manager, a paid council of five, the obliteration of ward lines and the initiative and referendum and recall.

#### Mayor Found Guilty of Fraud.

Muncie, Ind.—Seven alleged swindlers, including mayor Rollin H. Bunch of Muncie, and prosecuting attorney Horace G. Murphy of Delaware County, were found guilty in the Federal Court in Indianapolis of conspiring to use mails to defraud. The seven men were part of a group of twenty-four indicted in connection with the Muncie case, which involved more than twenty alleged swindling cases and a total of \$150,000. All the other defendants had pleaded guilty, some having changed their pleas to guilty during the trial.

## TRAFFIC AND TRANSPORTATION

#### Zone Fare Tried Again in New Jersey.

Trenton, N. J.—The Public Service Railway Company has filed with the Public Utilities Commission a temporary acceptance of the modified zone fare system, proposed by the commission after the company had asked permission to abandon the system as first tried because it proved a failure. The new rate is 5 cents for the first two miles, 1 cent for each mile thereafter, and 1 cent for a transfer. A statement issued by the company, after reviewing the earlier trial of the system, its reluctant conclusion that it could not succeed, its recommendations for its abandonment, and the commission's proposal of a modified zoning plan, continues: "The company has no pride of opinion in this matter, and is willing, out of deference of the expressed opinion and recommendation of the board, as set



forth in its last two reports on the subject, to continue the trial of the present zone plan for a limited time, with the modified rate of fare recommended by the board. The company takes this position in the hope that the board, the public, and its employees will all co-operate with it in this further trial of the zone plan, so that there may be no difference of opinion about its success or failure. The company agrees to this plan and these rates, in accordance with its understanding of the board's intentions, only as a trial for a limited period."

Camden, N. J.—This city, which put up a most stubborn fight against the zone fare system as first tried, is expected to prove just as inimical to the modified plan proposed by the Public Utilities Commission and agreed to for purposes of experiment by the Public Service Railway Company. Shipyard workers whose boycott of the lines was so violent it forced virtual suspension of service for some days, appear to be just as reluctant to permit trial of the new plan and Camden officials and citizens express themselves as extremely displeased with the proposed solution of the transit difficulties. In the absence of mayor Charles H. Ellis who led the fight against the zone system counsel E. G. C. Bleakley, also active in the struggle, issued this statement: "The trolley riders have won won a great victory. The trolley company has been forced to accept reduced rates of fare. Here in Camden we agree with the trolley company that the zone system is a failure. I think the people have always been willing to give any system a fair trial, but the people in the suburbs were not willing to pay fare in excess of the commutation rates on steam trains. Now, if the trolley company will go only one step further and introduce the sale of strip tickets from ticket offices at rates reduced below cash fares, I feel another step forward will have been taken toward inducing the trolley company's patrons to again patronize the lines. I am sure all the people of Camden will work together with the trolley company in its effort to have its present zone system done away with."

#### Toledo Carless.

Toledo, O.—With all street cars taken off the streets and removed to points across the state line into Michigan, the city is relying on jitneys, busses and other vehicles to transport its inhabitants. Removal of the street cars was the result of sudden and secret action by the Toledo Railways & Light Co., a subsidiary of the Cities Service Company, of which Henry L. Doherty of New York is president. The cars were taken off about 1:30 o'clock in the morning. Not only the cars in active operation, but even the open summer cars, snow sweepers and other traffic equipment taken off. The action of the company was taken when it learned the official vote on the ouster ordinance submitted to the people at the recent election. This ordinance was carried by 811 votes. The ordinance was passed by council last June when the company raised its fares from 5 to 6 cents and 2 cents extra for transfers. The company has no franchises for street car operation. When council passed this ouster ordinance it was held in abeyance when the street car company and business men petitioned for a referendum on the ordinance. Negotiations have not resulted in putting back the cars and the company officials do not expect resumption of service for a month. Negotiations are being carried on to develop a new franchise along modern lines involving a "cost-plus" plan, perhaps. Henry L. Doherty, operating head of the company, proposed the following courses if the city wished an early resumption of car service: 1—That the city council immediately enact two ordinances submitted to that body by the "Rail-Light" two months ago—the Taylor "service at cost" plan and the straight-out municipal ownership plan. 2—That organized labor, through the central labor union, the newspaper, the Commerce club and the public, determine what it wants in the meantime, so that when it goes to the polls to vote on the two ordinances it will give a decisive victory to one or the other. 3—That Mayor Schreiber immediately name competent persons to appraise the property of the "Rail-Light," Henry L. Doherty to pay \$25,000 toward this task. 4—The street

cars to be put in operation as soon as the council enacts the two ordinances and a valuation of the property has been completed, and the cars then to be operated until the voters determine which of the ordinances they desire.

## MISCELLANEOUS

### \$16,000,000 Developments Planned For Seattle.

Seattle, Wash.—The ultimate expenditure of an amount in excess of \$16,000,000 to carry out the plans of the city engineer's department which will bring about physical conditions in the vast industrial area south of the railroad depots permitting of the development of this property has been authorized by the city council. Council has called for the immediate preparation of detailed plans by city engineer Dimock covering the problems to be met under plan No. 1 of the five sets of plans submitted by the city engineer for consideration and outlined as follows:

Plan No. 1.—Provides that all of the running tracks of the railways and the railway yards as well shall be raised to such elevation whereby subways can be constructed beneath draining by gravity into sewers. In this plan it is not contemplated that service tracks nor tracks on East Marginal Way and Railroad Avenue shall be raised. The estimated cost of work planned is figured as follows: Retaining walls \$4,000,000, filling \$2,500,000 subways, viaducts and approaches \$9,500,000. Total \$16,000,000.

Plan No. 2.—Differs from Plan No. 1 only in respect to the elevation of the yards and running tracks, the general elevation being about five feet lower than in Plan No. 1. The cost is figured at \$14,500,000.

Plan No. 3.—Provides for the raising of the street grade sufficiently to permit of the railways to occupy the base grade and pass under the streets and is estimated to cost in excess of \$17,500,000.

Engineer Dimock stated that he did not advise this plan as being practical.

Plan No. 4.—Provides for the leaving of the tracks and yards at surface grade and raising those streets which intersect the railway tracks at a cost of \$11,500,000.

Plan No. 5.—Provides for the separation of passenger and freight traffic, passenger trains to be brought in on the easterly side of the tide flats to the present stations. Freight trains would be brought over East Marginal Way to a large distributing yard to be constructed south of Spokane Street and between Colorado Avenue and Duwamish Waterway. Present yards would be devoted to industrial uses served by spur tracks with an overhead structure on Spokane Street and on a few other streets in that vicinity. The cost of this project is not estimated in view of the fact that the value of the properties to be acquired cannot be determined.

The principal advantage of Plan No. 5 is the extension and enlargement of docks and slips along the East Marginal Way made possible by the proposed vacation of East Marginal Way and the substitution thereof of Colorado Avenue. It is pointed out that a great shipping point must have an adequate area of railway yards and trackage in close proximity to vessels.

### Dutch Municipalities Organize Building Material Company.

The Hague, Holland—The Central Building Material Supply Bureau of the Dutch Government, which was abandoned several months ago, has been replaced by a limited liability company called the Central Building Materials Supply Co. This company has a share capital of 3,000,000 florins (about \$1,200,000), divided into shares of 10,000 florins (about \$4,000) each. Half of the capital is already paid up, and according to the statutes of the company the remaining half must be paid up before January 1, 1923, unless the limit is extended by the Crown. Practically all of the capital is owned by larger municipalities in Holland. The object of the company is to buy, sell, work up, and prepare building materials of all kinds. The profits of the company are employed in the first place to pay 5 per cent. to the shareholders, any balance left over after this dividend is paid out being added to the reserve fund. This addition to the reserve fund is to continue until the fund is equal to the paid-up capital; any balance which then remains will be distributed as dividends. The Central Building Material Supply Co. is essentially a war organization; it is in effect a cooperative organization which has been brought into life with a view to serving the public interest. There is considerable opposition to the company from the side of private capital, and it is the announced intention of the directors to hold a general shareholders' meeting when the abnormal war conditions have somewhat disappeared for the purpose of deciding whether or not the company should liquidate.

## LEGAL NEWS

### A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

#### Injunction By Taxpayer of Corporate Stock Issue.

(N.Y.Sup.) A taxpayer may sue to enjoin issue of corporate stock for purpose of paying off revenue bonds, since the issue of corporate stock would diminish borrowing capacity of city for making of public improvements, and in the end increase city's interest charge. (Per Mills, J.)—*Schieffelin v. Hylan*, 176 N. Y. S. 809.

#### Interpretation of City Ordinances.

(Md.) The general rules of construction which govern in the interpretation of acts of the Legislature are applicable to ordinances, and the rules governing the courts in determining whether an act has been passed in accordance with constitutional provision are applicable in determining whether a city ordinance has been passed in accordance with the city charter.—*City of Baltimore v. First Methodist Episcopal Church of Baltimore City*, 107 A. 351.

#### Police Power to Destroy Property—Judicial Determination.

(Minn.) Though an order of municipal officer or board in the exercise of a police power restricting the use of property or ordering its destruction may not amount to taking of property without due process and may not entitle owner to an injunction, yet in some way he is entitled to have a judicial determination of the rightfulness of taking or destruction.—*Pelkey v. National Surety Co.*, 173 N. W. 435.

#### Assessing Railroad for Paving Street without Special Benefit.

(N.J.Sup.) Under P. L. 1896, p. 407 (1 Comp. St. 1910, p. 994) and an act revising and amending Charter of Newark approved March 11, 1857 (P. L. p. 116), an assessment for paving a street adjoining a railroad's property, but from which street there was no entrance by reason of an embankment, and for a sidewalk thereon, was illegal, as being without special benefit to a distinct railroad use.—*Erie R. Co. v. Board of Com'rs of Newark*, 107 A. 406.

The proper rule as to assessments of railroad property for local improvements is not on the basis of enhancement of its market value, but that it may be assessed to the extent of actual benefits for railroad purposes.—Id.

#### City Authorization of Increased Car Fares—Right of Taxpayers to Sue.

(La.) Action of city of New Orleans in authorizing by ordinance a temporary increase of street railway fares, not releasing or extinguishing an indebtedness, liability, or obligation of a street railway corporation to city, but having effect of increasing amounts to become due by increasing company's revenues of which city receives a certain percentage, did not violate Const. art. 59, as to release of debts to municipalities.—*Black v. New Orleans Ry. & Light Co.*, 82 So. 81.

The putting into effect of modification of city's contract between city of New Orleans with street railway, permitting a temporary increase of fares by city of New Orleans, before 10 days after adoption of ordinance was permitted under city charter (Act No. 159 of 1912, § 35), and where 10 days had passed since ordinance was adopted, the property rights of resident taxpayers were not affected by such action, even if irregular.—Id.

Contracts between a city and a street railway permitting an increase in fares as a war measure for a limited time at suggestion of national authorities to avoid receivership, etc., were made for public good, so that city taxpayers not alleging any vested right in contracts, or that ordinance was unreasonable or in bad faith, or that their taxes would be increased, and not referring to any law forbidding city to modify contract, had no interest to sue to enjoin collection of increased fares, and suit against city will be dismissed, in view of Code Prac. art. 15.—Id.

#### Pension for Policeman's Widow—Pneumonia while on Duty.

(N.J.) The widow of a police officer, who while unwell went on duty on a foggy, damp night and suffered a chill, which developed into fatal pneumonia, was entitled to receive a pension under P. L. 1911, p. 104, § 4.—*Maitland v. Board of Police Com'rs of City of Garfield*, 107 A. 411.

#### Powers of Public and Quasi-Public Corporations.

(Fla.) "Municipal corporations" embrace incorporated cities, villages, and towns, which are full-fledged corporations with all the powers, duties, and liabilities incident to such status.—*Forbes Pioneer Boat Line v. Board of Com'rs of Everglades Drainage Dist.*, 82 So. 346.

When a private corporation is invested with certain powers of a public nature to permit it to discharge duties to the public, it loses its strictly private character and becomes quasi public, a corporation being public when created for public purposes only, connected with the administration of government, and where the whole interests and franchises are the exclusive property and domain of the government itself.—Id.

Public corporations are subdivided into municipal and public quasi corporations, the latter possessing only a portion of the powers, duties, and liabilities of corporations, such as counties, townships, school districts, etc.—Id.

#### Assessment of Buildings Under Construction.

(N.Y.Sup.) Greater New York Charter, § 889a, as added by Laws 1913, c. 324, provides that "a building in course of construction, commenced since the preceding 1st day of October and not ready for occupancy, shall not be assessed," must be interpreted in light of Tenement House Law, §§ 120, 121, relating to construction and occupancy, and a building is no longer "in course of construction" when it is completed pursuant to requirements of law.—*People ex rel. No. 176 West Eighty-Seventh St. Corporation v. Cantor*, 176 N.Y.S. 593.

Where construction of apartment house was compelled in accordance with laws and plans approved by building and tenement department, prior to October 1, 1917, at which time all apartments were leased, and rents for that month paid in full in advance, it was not exempt from taxation under Greater New York Charter, § 889a, as added by Laws 1913, c. 324, as a "building in course of construction," though on that date all steam radiators had not been installed or connection of some gas ranges made.—Id.

#### Sewer Contract Bond—Claims for Labor and Material Enforceable.

(S.D.) A contractor building city sewers had the right for his own benefit to enter into contract with the defendant surety under which the latter might obligate itself to pay labor and materialmen upon contractor's failure to pay them, and materialmen not named therein could accept the contract thus tendered by the insurer and become parties thereto with right of action in case of contractor's default, and such contract would not be affected by the fact that it also indemnified the city against laborers' and materialmen's claims.—*Evans & Howard Fire Brick Co. v. National Surety Co.*, 173 N. W. 448.

Where the consideration for a contractor's bond was paid by the contractor and not by the city, such payment would constitute sufficient consideration, even though laborers and materialmen for whose benefit it may have been given were not named as parties thereto nor even cognizant of his existence, and such persons by adopting the promise made for their benefit could put themselves into privity with the promisor and enforce the promise.—Id.

Where a contractor has expressly agreed to pay all claims for labor and material and his guarantor binds himself to pay for such labor and material equally with the contractor, laborers and materialmen may adopt such guaranty and enforce it the same as though made directly to them.—Id.



## NEWS OF THE SOCIETIES

**Dec. 10. AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS.** Annual convention, Louisville, Ky.

**Dec. 25. AMERICAN SOCIETY OF MECHANICAL ENGINEERS.** Annual meeting, New York City. Secretary, Calvin W. Rice, 29 West 39 st., New York City.

**Feb. 9-13, 1920.—AMERICAN ROAD BUILDERS' ASSOCIATION.** Annual convention, Louisville, Ky. Secretary, E. L. Powers, 150 Nassau street, New York City.

**May 18-21, 1920. NATIONAL ELECTRIC LIGHT ASSOCIATION.** Annual convention, Pasadena, Cal. Acting Secretary, S. A. Sewall, 29 West 39 st., New York City.

### New England Water Works Association.

The December meeting of the New England Water Works Association will be held at Hotel Brunswick, Boston, Mass., December 10. Following a meeting of the executive committee at the headquarters, Tremont Temple and a lunch served at Hotel Brunswick, Copley Square, the following papers will be read in the afternoon:

"My Trip to France," Col. Richard K. Hale, Boston, Mass. Report of Committee on Budget for 1920, George A. Carpenter, Chairman, City Engineer, Pawtucket, R. I. Discussion of Creed W. Fulton's Paper, "Modern Pumps for Small Water Works," opened by A. O. Doane, Div. Engineer, Metropolitan Water Works, Boston, Mass. "Description of Motor Driven Portable Thawing Machine Mounted on Truck," Frank J. Gifford, Supt. Dedham Water Company, Dedham, Mass.

### American Association of Engineers.

The Engineers' and Architects' Association of Southern California, a society of three hundred engineers and architects which has been in existence for over twenty-five years, voted on October 25th to amalgamate with the American Association of Engineers. The new organization will be a combination of the E. and A. Association and the Los Angeles Chapter of the American Association of Engineers, and will be known as the "Engineers' and Architects' Association—Los Angeles Chapter of the American Association of Engineers." The officers of the Engineers' and Architects' Association are H. A. Osborne, president; J. J. Backus, first vice-president; H. L. Smith, second vice-president. The directors are A. B. Benton, G. B. Bergstrom, A. H. Koebig, and George P. Robinson. Mr. Robinson is also secretary of the organization.

The American Association of Engineers has recently organized chapters or clubs in the following cities:

Globe-Miami, Ariz.; Terre Haute, Ind.; Phoenix, Ariz.; San Antonio, Tex.; Tulsa, Okla.; Joliet, Ill.; Butte, Mont.; University of Minnesota; University of Arizona; University of Michigan; Davenport, Ia.; Rock Island, Ill.; Moline, Ill.; Morgantown, Pocahontas, W. Va.; El Reno, Okla.; Arkansas City, Ark.; Akron, O.; Springfield, Ill.; New Orleans, La.; Newell, S. D.

The establishment of a club at the last named city is of particular interest because of the fact that it is named after Dr. F. H. Newell, now president of the American Association of Engineers, while he was director of the United States Reclamation Service. Newell is north and west of the Black Hills and at the point of one of the former operations of the Reclamation Service.

The Houston (Texas) Engineers' Club has voted almost unanimously to affiliate with the American Association of Engineers. The officers elected by the Houston Club are: L. T. Peden, president; A. C. Finn, vice-president; C. N. Campbell, second vice-president; W. A. McDonald, third vice-president; S. M. Udden, secretary-treasurer.

The Chattanooga Chapter of A.A.E. is offering its members courses in night work in reinforced concrete, physics, chemistry, Spanish, English, salesmanship and other subjects. Additional courses will be added as a demand for them develops. The tuition is free but members enrolling are required to deposit a registration fee of \$2.50 for each two courses, which is refunded upon completion of the work. The year's program is divided into two terms of twelve weeks each, the first commencing on October 14th.

The following officers have been elected by the Utah Chapter of the American Association of Engineers which has headquarters in Salt Lake City: W. A. Richmond, president; W. A. Alexander, 1st vice-president; C. S. Fisher, 2nd vice-president; Jos. Blinksderfer, secretary and Eugene Bush, treasurer.

### Society of Terminal Engineers.

At its recent regular meeting in New York City, at Engineering Society's building, the Society of Terminal Engineers again discussed the question of design and construction of the new municipal piers proposed for Staten Island, N. Y.

The discussion was an extended one and it resulted in the passing of a resolution providing for the appointment of a committee of seven members to investigate, study and report on the general and broad question of the relative costs of handling freight manually and mechanically in this country and Europe.

This committee is headed by Charles Whiting Baker, and other members are engineers especially experienced in the use of mechanical handling appliances. B. F. Cresson, jr., chief engineer of the New York & New Jersey Port and Harbor Development Commission, who is now investigating very thoroughly this same question as bearing on the pending plan for the port of New York, is a member of this committee. This special committee is expected to go over the handling costs in a very thorough manner, embracing every mechanical movement. It will

not only consider and study American conditions but will also include the conditions bearing on this question in British, German, Belgian and French ports.

All information secured by this committee and bearing on relative handling costs will be brought up to date and will reflect actual conditions.

It was generally the consensus of opinion that the plans for the Staten Island piers construction should be changed so that all piers would be made wider than 125 ft. and be of such design as to make possible the application of labor saving devices.

### Western Society of Engineers.

As the result of the recent fiftieth anniversary membership campaign of the Western Society of Engineers, a total of 2096 applications were received, thus increasing the membership to almost three times what it was before the campaign. The success of this campaign led to a general meeting of the society, held in its rooms in Chicago on Nov. 3, at which plans for the future of the society were discussed.

E. T. Howson, chairman of the Development Committee, presented a general report of the work done by this committee so far in discussing plans for expanding the work of the society and increasing its value to the membership. Much study has been given to this matter, especially in view of the very large increase in membership.

It was proposed to have, aside from the regular weekly or semi-weekly evening meetings, occasional luncheon meetings, these to be devoted largely to civic and nontechnical subjects, but which engineers should keep closely posted on. This suggestion was indorsed by many speakers who thought that one such a meeting a month would be very valuable, not only in broadening the knowledge of engineers, but in enabling them to meet socially more frequently.

The society now has five sections devoted to electrical engineering, mechanical engineering, bridge and structural engineering, sanitary, hydraulic and municipal engineering and gas engineering. Three new sections have been authorized as follows: Electrical communication, industrial engineering and railroad engineering. Several speakers advocated the formation of still other sections, devoted to chemical engineering, power-plant engineering and public affairs.

An extension of the committee work was also discussed and among the suggestions made was that a committee be organized to gather data from construction projects involving deep foundations to secure definite information as to the depth of rock in different mittee suggested was one to keep posted on proposed city ordinances involving engineering matters; another one that may be organized should investigate accidents in engineering structures, still another may draft standard contract forms for construction work.

## INDUSTRIAL NEWS

The Willite Road Construction Co., 51 Chambers st., New York City, reports that Willite pavement has been laid this season in Kingston, N. Y.; Greensboro, N. C.; Brockton, Mass.; Detroit, Mich.; Bluffton, O.; Spencer-ville, O., and Atlanta, Ga. The Western Willite Construction Co., has laid Willite in a number of places in its territory West of the Rockies.

### Contractors' Organization Opposes Indiscriminate Cost Data Used by Manufacturers.

The Associated General Contractors of America are interested in correcting a tendency on the part of manufacturers equipment and materials used in highway construction to issue indiscriminately inadequate and low cost data to contractors. The organization quotes the following letter received from a contractor who has carefully studied the highway field as well as other branches of construction.

"There is a lot of misinformation being handed out by material dealers and machinery manufacturers in the way of costs. This is especially true in the case of the hard roads program. Representatives of these concerns press upon the engineers low estimates of cost, and then give the same figures to contractors who are either unable to figure the work, or who have not had the necessary experience to qualify them to judge as to whether the information given them is of value or not. Of course, the object of this propaganda is to sell goods, and these men do not intentionally misrepresent costs, but the fact remains that they do, and a low scale of estimated costs is established that reputable contractors have to bump up against."

"There is no doubt," says the organization, "that one of the factors which has been of great influence in keeping many of the larger contractors from actively entering the road building field has been the tendency to keep estimates so low as to preclude a reasonable profit. While the more experienced highway engineers are now getting away from this practice, the great increase in highway construction has caused the preparation of plans and estimates so low as to preclude a lot of men who are without sufficient knowledge of the subject, and the scarcity of contractors has led firms which have never done such work to bid without a careful study of the situation."

"Under these conditions it becomes a frequent occurrence for the inexperienced engineer and the inexperienced contractor to be misled by the glowing accounts of equipment performance given out by machinery salesmen or the low cost figures furnished by material men, with the result that the estimate is too low, the bid is too

low, and the contractor's bank account soon becomes too low for comfort.

"Cooperation on the part of members of the A. G. C. in putting the issue squarely before the firms whose representatives offer unduly low cost figures should be effective in correcting the situation. Comment on the subject and instance of this abuse will be welcomed by the Secretary."

### Convention of the American Concrete Pipe Association.

The annual convention of the American Concrete Pipe Association will be held in Chicago February 20 and 21. Sectional meetings are to be held in committee rooms of the Great Northern Hotel, but the main convention will take place in the lecture room of the Western Society of Engineers, Monadnock Building—just across the street from the Great Northern.

One section of the convention will be subdivided into three main groups represented in the association—drain tile, reinforced pipe, and sewer pipe.

The annual dinner and entertainment will take place at the Great Northern Hotel Friday night, February 20.

The secretary-treasurer of the association is G. E. Warren, 210 South La-Salle st., Chicago.

The City Supply Co., has been organized in Greenwood, S. C., with temporary quarters in the Peoples Bank bldg., to handle all kinds of municipal and county supplies. The company will act as selling agent for manufacturers of the various articles needed by town and county governments, such as road building machinery and material, road and street signs, disinfectants, street sprinklers, flushers, etc. A McD. Singleton will have charge of the office as manager.

### Motor Transport Show

A striking presentation of the war record of the motor truck was made by the Motor Transport Corps in an exhibition of equipment in New York City, October 16-18.

"Why America Won the War" was the proud slogan of the transport men that was placarded above typical "reasons" in the form of American made trucks and trailers that have seen war service. German trucks were exhibited in comparison to point to an obvious superiority of the American machines.

Practically the only opportunity to appreciate the wonderful work of this organization that has heretofore been offered to the public has been in military parades and then only a fleeting glance has been afforded. However the personal contact with the men and with the implements of the corps at the exhibit proved a lesson in American progressiveness in a remarkable combination of proficiency, skill and accomplishment.

An American ambulance that had carried 15,000 wounded was one of the principal exhibits. It had travelled 20,-

000 miles in 441 days of active service.

A massive Mack 5-ton searchlight truck that had been used by the engineers for night work in building roads and bridges was one of the features that revealed the adaptability of the truck. A generator attached to the motor in this truck supplies the current for a 1,000,000 candle power field searchlight.

The display of motors included aeroplane, passenger car, and motor truck types.

Trailers of varied description were there to show their usefulness. Photographic trailers with gasoline hot-air heaters, dental bodies with tanks for gas and a telephone exchange with full equipment, were included.

The Motor Transport Corps controls all army motor equipment except heavy artillery tractors, tanks and hospital ambulances. When we entered the war, the United States army did not own more than a thousand motor trucks. A year and a half later it had 124,800 trucks and passenger cars and 21,780 motorcycles in France, and 33,700 trucks and passenger cars and 10,170 motorcycles in this country. Of this total of 190,450 motor vehicles, all but 7,800 were American made.

### Exhibition by Lighting Fixture Manufacturers.

The first annual lighting fixture market and chandelier show will be held Feb. 9-13 in Detroit by the National Council of Lighting Fixture Manufacturers. Conventions of the Lighting Fixture Dealers' Society of America and of the Illuminating Glassware Guild will also be held at the same time. The demand for exhibits space indicates that the show will be a success. C. H. Hofrichter, 8410 Lake avenue, Cleveland, is secretary-treasurer of the National Council of Lighting Fixture Manufacturers and is in charge of arrangements for the show.

The Goodyear Tire & Rubber Company, Akron, Ohio, announces the creation of the position of sales manager, and the appointment to that position of L. C. Rockhill, who is widely known in the trade. The Company also announces the close of the most successful year in its already remarkable history, with a total gross sales of over \$169,000,000.

Mr. Rockhill has been with Goodyear something over twelve years. Previous to that time he was in the advertising department of a Cleveland newspaper. His first service with Goodyear was in charge of the repair department, which was a subdivision of the automobile tire department, handling repairs and adjustments. He was successively made manager of the aeronautical department, manager of the automobile tire department and assistant sales manager in charge of tire sales.



# ADVANCE CONTRACT NEWS

## ADVANCE INFORMATION BIDS ASKED FOR

## CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

### BIDS ASKED FOR

#### STREETS AND ROADS.

- Ark., Osceola.** 2 pm, Dec. 16.  
Improving road in Mississippi co., involving 30 acres clearing and grubbing; 15 acres grubbing; 9,270 rods fence-moving; 460,000 cu. yd. earth excav.; 2,000 lin. ft. 12-in. vitr. clay pipe; 18 catch basins with castings; 5,963 cu. yd. concr. for bridges, culverts, abutments and retaining walls; 25,340 lin. ft. cement concr. curb and gutter; 532,550 sq. yd. cement concr. paving, 20 ft. wide, 8 in. thick; 17,590 sq. qd. 30 ft. wide and 7% in. thick, reinforced; 27,250 sq. yd. 40 ft. wide 7% in. thick, rein.; 7,550 sq. qd. 50 ft. wide, 7% in. thick, rein.; 360,000 lin. ft. round bars for reinforcing paving; 16,426 cu. yd. rock or gravel subbase, etc.—R. C. Rose, secy., Rd. Impvt. Dist. no. 1.
- Ga., Sylvester.** 11 am, Dec. 19.  
3.95 mi. fed. aid proj. no. 210 in Worth co., involving 37,333 sq. yd. asphaltic concr., Kentucky rock asphalt, on penetration macadam pavement, 16,494.3 cu. yd. borrow excav. and 9,340.6 cu. yd. common excav.; concr. arch culverts and box culverts, concr. slab and T-beam bridges—O. H. Lang, proj. engr., Moultrie.
- Ga., Quitman.** Dec. 9.  
Grading and paving 7 mi. roads in Brooks co.—Garrett & Slack, engr., Montgomery, Ala.
- Ind., Danville.** 2:15 pm, Dec. 12.  
Road in Clay and Franklin twps. and road in Marion twp. Hendricks co.—C. M. Havens co. aud.
- Ind., Delphi.** 1:30 p. m. Dec. 15.  
Gravel road between Carroll and Tippecanoe cos.—R. D. Good, aud., Carroll co.
- Ind., Brazil.** 10:30 a. m. Dec. 15.  
3,953 ft. stone and gravel road between Vigo and Clay cos.; 4 stone and gravel roads in Van Buren (2) Jackson and Harrison twps. and stone road in Washington twp., all in Clay co.—W. E. Parrish, co. aud.
- Ind., Indianapolis.** 10 am, Dec. 10.  
Improving city street by grading and paving roadway Bd. pub. wks.
- Ind., Fort Wayne.** 10 am, Dec. 16.  
14,386 ft. concr. road in Aboit twp.; 12,793 ft. concr. road in Aboit twp. and 14,950 ft. concr. road in Adams twp., Allen co.—A. G. McCoy, co. aud.
- Ind., Evansville.** 10 am, Dec. 18.  
Gravel road in Union twp.—W. Copeland, co. aud., Vanderburgh co.
- Ind., Anderson.** 10 am, Dec. 22.  
14,960 ft. concr. road in Monroe twp., Madison co.—E. T. Flahavin, co. aud.
- la., Fort Dodge.** 9 am, Dec. 9.  
95 yd paving and 65 lin. ft. curbing and guttering (bitulithic, asphalt, or asphaltic concr.—C. H. Reynolds, city engr.
- la., Odebolt.** Dec. 9.  
130,000 sq. yd. paving and 70,000 lin. ft. curb and gutter—W. E. Standeven, engr. Omaha, Neb.
- Kan., Oswego.** 2 pm, Dec. 12.  
2 sections fed. aid proj. no. 2 in Labette co., involving 123,657.3 ft. gravel surfacing on macadam base, 16 ft. wide, with 4 ft. earth shoulders as follows: Sect. C—35,083 cu. yd. earth excav., 23,071 cu. yd. earth borrow, 6,100 ft. standard guard rail, etc.; Sect. D—44,958 cu. yd. earth excav., 2,750 cu. yd. earth borrow, 557 cu. yd. rock excav., 5,640 ft. standard guard rail, 204 ft. farm drain tile, etc.—E. A. Milliken, co. clk.
- Kan., Frankfort.** 7:30 pm, Dec. 18.  
Pavement of 3-in. vertical fiber brick or asphaltic concr. wearing surface, involving 9,836.8 cu. yd. excav.; 39,841.2 sq. qd. pavement, 21,307.2 lin. ft. 24-in. curb and gutter; 1,010 lin. ft. 12-in. and 1,400 lin. ft. 18-in. storm sewer, 18 catch basins, 5 manholes and 3 small culverts—Shockey Engr. Co., 740 Reserve Bank bldg., Kansas City, Mo.
- La., Lake Charles.** 10 am, Dec. 10.  
16,000 sq. yd. pavement in city streets—E. S. Crosby, comr. sts. & parks.
- La., New Orleans.** noon, Dec. 15.  
Gravel-surfacing following hwy.: 3.98 mi. Ruston-Arcadia, 3.78 mi. Ruston-Arkansas, 3.36 mi. Ruston-Farmerville and 3.23 mi. Ruston-Monroe hwy. in Lincoln parish; 12.98 mi. Columbia-Colfax hwy. in La Salle parish—Duncan Buie, state hwy. engr., 738 Maison Blanche annex.
- Mass., Boston.** noon, Dec. 9.  
34,000 ft. concr. road between Groton and Littleton—F. I. Bieler, secy., State hwy. comn., state house.
- Mich., Lansing.** 1:30 pm, Dec. 12.  
Improving 1.345 mi. road between Homer and Lincoln twps., Midland co., by shaping road, drainage structures and gravel surfacing to width of 16 ft.—F. F. Rogers, state hwy. comr.
- Mich., Lansing.** 1:30 pm, Dec. 9.  
Improving 1 mi. road between Meade and Hume twps., Huro co., involving shaping road, drainage structures, and gravel surfacing to width of 16 ft., or surfacing with stone-gravel, bituminous macadam or concr.—F. F. Rogers, state hwy. comr.
- Mich., Lansing.** 1:30 pm, Dec. 12.  
Improving 0.992 mi. road in Mayfield twp., Grand Traverse co. by grading and gravel surfacing to width of 16 ft.; also 1.543 mi. road in Sagola twp., Dickinson co., by clearing, grubbing, shaping road, drainage structures and gravel surfacing to width of 16 ft.—F. F. Rogers, state hwy. comr.
- Mich., Lansing.** 1:30 pm, Dec. 10.  
7,411 mi. 16-ft. class B gravel road in Lansing twp., Bingham co. and Bath twp., Clinton co.—F. F. Rogers, state hwy. com.
- Minn., Lansing.** 1:30 pm, Dec. 10.  
Subgrade constr. as follows: State job no. 1903, Div. 1 and 2-132 acres, clearing, 127 acres grubbing, 255,867 cu. yd. excav., 599,507 cu. yd. overhaul, 53,739 cu. yd. ditching, 25 mi. in length; 9.3 mi. state job no. 1903, Div. 1 and 2-132 acres, clearing, 127,216 cu. yd. overhauling and 13,587 cu. yd. ditching; clearing and grubbing road, all in St. Louis co.—W. H. Borgen, co. aud.
- Minn., Gaylord.** 1 pm, Dec. 23.  
1 mi. fed. aid proj. no. 116, involving 68,000 cu. yd. excav., 2,000 cu. yd. riprap, loading and hauling 1,755 cu. yd. gravel surfacing material, furnishing and installing 105 ft. 30-in. and 25 ft. 15-in. portable culvert pipe—F. Hoppenstedt, co. aud.
- Minn., Alexandria.** 8 pm, Dec. 15.  
32,820 sq. yd. pavement; resetting 3,610 lin. ft. granite curb; 6,420 lin. ft. straight concr. curb; 1,188 lin. ft. circular concr. curb; 904 lin. ft. 10-in. and 418 lin. ft. 12-in. storm water sewer, 2 manholes, 26 storm water inlets with 8-in. vitr. pipe connection to sewer—C. L. Pillsbury, Metropolitan Life bldg., Minneapolis.
- Miss., Rolling Fork.** noon, Dec. 9.  
13.1 mi. fed. aid proj. no. 61, in Sharkey co., involving 1 acre clearing and grubbing; 78,132.9 cu. yd. embankment; 356 lin. ft. 18-in. and 356 lin. ft. 24-in. corrugated metal pipe; 247.8 cu. yd. concr.; 12,946.64 lbs. reinforcing steel; 107,293 sq. yd. concr. paving—X. A. Kramer, state hwy. engr., Jackson.
- Miss., Jackson.** noon, Dec. 10.  
4.5 mi. fed. aid proj. no. 81 in Bolivar co., involving 23,600 sq. yd. concr. pavement, 60,000 cu. yd. grading, 4,080 cu. yd. gravel in place, 5,700 lbs. steel, etc.—X. A. Kramer, state hwy. engr.
- Miss., Jackson.** 2 pm, Dec. 16.  
3.6 mi. fed. aid proj. no. 80 in Adams co., involving 4.3 acres clearing and grubbing, 30,000 cu. yd. excav., 5,700 cu. yd. gravel, etc.—X. A. Kramer, state hwy. engr.
- Miss., Jackson.** 2 pm, Dec. 17.  
17.9 mi. fed. aid proj. no. 41 in Wilkinson co., involving 47 acres clearing and grubbing, 108,000 cu. yd. excav., 12,000 cu. yd. borrow, 270 cu. yd. concr., 1,000 lin. ft. culvert pipe, 105,000 ft. lumber in bridges, 3,900 ft. piling, 20,550 cu. yd. gravel, 13,000 lbs. reinforcing steel—X. A. Kramer, state hwy. engr.
- Miss., Jackson.** noon, Dec. 9.  
13.1 mi. fed. aid proj. no. 61 in Sharkey co., involving 1 acre clearing and grubbing, 78,132 cu. yd. embankment, 356 lin. ft. 18-in. and 114 lin. ft. 24-in. corrugated metal pipe, 12,946 lbs. reinforcing steel, 107,293 sq. yd. concr. paving, etc.—X. A. Kramer, state hwy. engr.
- N. Y., Albany.** 1 pm, Dec. 9.  
Completing road in Oswego co., involving 6.36 mi. bituminous macadam—F. S. Greene, state hwy. comr.
- N. Y., Albany.** 1 pm, Dec. 9.  
Improving following hwy.: 4.78 mi. in Jefferson co.; 1.44 and 1.27 mi. in Rensselaer co.; 3.64 mi. in St. Lawrence co.; 4.17 mi. in Saratoga co.; and 2 mi. in Steuben co.; also completing 5.35 and 6.93 mi. in Broome co.; 6.36 mi. in Oswego co.; 6.1 mi. in Saratoga co.; 3.17 mi. in Ulster co.; 9.63 mi. in Wyoming co.; and 9.63 mi. in Yates co.—F. S. Greene, state hwy. comr.
- N. C., Greenville.** noon, Dec. 19.  
13.94 mi. hwy. in Pitt co., involving 19,161 cu. yd. earth excav.; 24,172 cu. yd. borrow; 130,897 sq. yd. monolithic brick, or concr. base, or 1-course cement concr. pavement, or 122,717 sq. yd. bituminous pavement on concr. base; 708 lin. ft. 24 to 36-in. rein. oncro. pipe; 2 acres clearing and grubbing; 8,589 cu. yd. side drain ditches; and one 16-ft. span rein. concr. bridge—J. B. Harding, co. hwy. engr.
- N. C., Raleigh.** noon, Dec. 22.  
1.645 mi. state hwy. in Cleveland co., involving 1,630 cu. yd. earth excav.; 17,374 sq. yd. combination concr. base and header curb; 16,409 sq. yd. warrenite or willite or sheet asphalt or topeka pavement—W. S. Fallis, state hwy. engr.
- N. C., Raleigh.** noon, Dec. 23.  
1.352 mi. state hwy. in Cabarrus co., involving 14,260 sq. yd. combination base and header course; 3 acres clearing and grubbing, 2,100 cu. yd. earth excav., etc.—W. S. Fallis, state hwy. engr.
- O., Toledo.** noon, Dec. 9.  
Grading alley and necessary drainage, etc.—D. H. Goodwillie, dir. pub. serv.
- O., Cleveland.** Dec. 17.  
Grading Pleasant Village road in Parma twp.—W. A. Stinecomb, co. engr.
- O., Euclid.** Dec. 22.  
Sidewalks and 6-in. water main in vil. street—F. A. Pease, engr., Marshall bldg., Cleveland.
- Pa., East Brady.** 8 pm, Dec. 15.  
Grading, curbing and paving various streets, involving 3,500 cu. yd. grading, 5,600 lin. ft. curbing, 8,060 sq. yd. paving, 1,280 lin. ft. 12-in. to 18-in. pipe sewer, 9 special catch basins and 4 standard catch basins—Douglass & McKnight, boro engr., Columbia Bank bldg., Pittsburgh.

**Pa., Harrisburg.** 10 am, Dec. 16.  
Constructing following pavements: 10,452 lin. ft. rein. concr. in Allegheny co.; 10,610 ft. rein. concr. in Armstrong co.; 10,643 ft. rein. concr. and 25,654 ft. rein. concr. with Hillside vitr. brick in Beaver co.; 43,950 ft. rein. concr. in Berks co.; 75,984 ft. rein. concr. in Butler co.; 39,911 ft. rein. concr. in Clearfield co.; 23,420 ft. rein. concr. in Carbon co.; 1,720 ft. rein. concr., and 5,326 ft. brick in Centre co.; 11,523 ft. rein. concr. in Chester co.; 18,514 ft. rein. concr. and Hillside vitr. brick in Crawford; 10,700 ft. rein. concr. in Delaware; 36,275 ft. rein. concr. in Elk co.; 52,977 ft. rein. concr. in Erie co.; 41,207 ft. rein. concr. and Hillside vitr. brick and 15,859 ft. rein. concr. in Fayette co.; 23,201 ft. rein. concr. in Greene co.; 26,236 ft. rein. concr. in Lawrence co.; 4,231 ft. rein. concr. in Luzerne co.; 8,596 ft. bituminous surface on concr. or rein. concr. in Montgomery co.; 14,750 ft. rein. concr. in McKean co.; 46,260 ft. rein. concr. in Northampton co.; 18,140 ft. rein. concr. in Northumberland co.; 8,358 ft. bituminous surface on concr. or rein. concr. in Pitter co.; 5,900 ft. rein. concr. in Somerset; 3,844 ft. rein. concr. and Hillside vitr. brick in Susquehanna; 6,280 ft. rein. concr. in Tioga; 55,571 ft. rein. concr. and 22,383 ft. rein. concr. and Hillside vitr. brick in Warren co.; 98,919 ft. rein. concr. and Hillside vitr. brick in Westmoreland co.; also bridges in various cos.—L. S. Sadler, state hwy. comr.

**Tex., Ft. Worth.** Jan. 1.  
Grading and concr. surfacing 5.8 mi. 18-ft. hwy., rebuilding 10 mi. 18-ft. road and 6.2 mi. 18-ft. road in Tarrant co.—R. V. Glenn, engr.

**Wash., Fort Worden.** 11 am, Dec. 22.  
Gravel road and cement sidewalk at Fort Casey, including removing present trestle across Lake Crockett, filling roadway embankment of 8,000 yd., 1,698 ft. 5-ft. cement sidewalk, 1,437 ft. 4-ft. wooden sidewalk, gutter, handrail, necessary culverts, drains, catchbasins, etc.—Constructing Quartermaster, Fort Worden.

## SEWERAGE.

**La., New Orleans.** noon, Dec. 15.  
Sewerage and water works—F. S. Shields, secy., Sewerage and Water Board.

**Minn., Elmore.** 8 pm, Dec. 12.  
Storm sewers and sanitary sewers, involving 970 ft. 15-in. and 1,940 ft. 12-in. storm sewers; and 4,040 ft. 8-in., 190 ft. 10-in., 930 ft. 12-in. and 530 ft. 15-in. sanitary sewer—E. R. McQuarie, vil. recorder.

**O., Toledo.** noon, Dec. 9.  
Sanitary sewers in various city streets—D. H. Goodwillie, dir. pub. serv.

**O., Hamilton.** noon, Dec. 14.  
Improving street by constructing sanitary sewers and house connections with vitr. sewer pipe, with drain tile, manholes, flush basins, water mains, etc.—F. J. J. Sloat, dir. pub. serv.

**O., Cleveland.** noon, Dec. 16.  
Constructing grit chambers, flow channels, etc. at easterly sewage treatment works, including removing concr. and settling basin, excavating all necessary material, constructing 12 concr. grit chambers with necessary piping and valves, concr. flow channels and pump chambers, and final grading and trimming of grounds—Comr. engrg., 618 city hall.

**O., Euclid.** Dec. 22.  
Storm sewer in vil. st., 6-in. water mains and sidewalks in 2 streets—F. A. Pease, engr., Marshall bldg., Cleveland.

**Vt. Burlington.** noon, Dec. 22.  
Tile underdrain in city street—T. W. Dix, engr.

## WATER SUPPLY.

**Ga., Unadilla.** Dec. 31.  
Extending water works system and installing electric lighting system—Mayor.

**Ill., Jacksonville.** Jan. 1.  
Filtration plant—E. M. Henderson, engr.

**Mich., Sault Ste. Marie.** Dec. 22.  
Furnishing 4 electric pumps for pumping station—A. J. Eaton, city clk.

**N. Y., Albany.** 3 pm, Dec. 12.  
Excavating and backfilling trenches for water mains in city street; constructing retaining wall, receiving basin and gutter—Bd. contracts & supply, city hall.

**O., Toledo.** noon, Dec. 16.  
Furnishing during year 1920 following material: 1,506 tons cast iron water pipe, 4 to 12-in.; 40 tons cast iron water pipe, special fittings; 210 hub end gate valves; 200 five-in. fire hydrants; 100 tapping sleeves and valves; 50 tons pig lead; 3,633 water meters; 200 one-in. corporation cocks; 4,000 3/4-in., 200 1-in. curb cocks; 4,000 3/4-in. corporation cocks; 56 tons 3/4-in. lead pipe and 12 tons 1-in. lead pipe; 5,000 cast iron curb boxes; and 3 tons wiping solder—J. J. Judge, comr. purchases & supplies.

**O., Cleveland.** noon, Dec. 19.  
One first high service steam turbine reduction gear driven centrifugal pump for div. of water—Comr. water, 305 city hall.

**Pa., Summit Hill.** 10 am, Dec. 10.  
Improving water works system, including furnishing and setting 2 deep well pumps, 150 g. p. m. each, with motors; 2 pump houses, piping, ditching, valves, etc.—Gannett, Seelye & Fleming, Inc., engrg., Harrisburg.

**Pa. Erie.** 1.30 pm, Dec. 12.  
Rein. concr. covered reservoir—Chester & Fleming, engrg., Union Bank bldg. Pittsburgh.

**S. C. Williston.** Dec. 9.  
Water distributing system; furnishing 5,875 ft. 1 1/2 to 10-in. pipe; 6.5 tons special castings, 8-in. valve, twelve 1-in. valves, 14 valve boxes, lead and packing; laying and setting 16,123 ft. pipe, 26 hydrants, etc.—Ryan Engrg. Co., engrg., Sumter.

**Man., Winnipeg.** 3 pm, Dec. 15.  
Supplying hydrants and valves for water works system—City engr., 223 James ave.

**Ont., Welland.** Dec. 18.  
Excavating and laying water mains—H. L. Pratt, twp. clk., police station.

## LIGHTING AND POWER.

**Minn., Hastings.** pm, Dec. 10.  
Erecting and completing power plant at Insane Asylum—C. H. Johnson, archt., 715 Capital Bank bldg., St. Paul.

**Wash., Seattle.** 10 am, Dec. 19.  
Furnishing four 5667 kv-a oil insulated, water-cooled transformers with accessories and oil; also two 66,000 volt, non-automatic, electrically operated, oil circuit breakers, complete—C. B. Bagley, secy., bd. pub. wks.

**P. R. Point Borinquen.** Dec. 17.  
Light station here—Comr. light houses, Washington, D.C.

## BRIDGES.

**Kan., Ft. Scott.** Dec. 15.  
Bridges, culverts and farm entrance culverts in Bourbon co.; also one double 16-ft. concr. slab bridge in Franklin twp., one 6x6-ft. stone arch culvert, Osage twp. and 11.58 cu. yd. earth and rock fill over Williams arch culvert in Pawnee twp.—Bourbon co. clk.

**Minn., Owatonna.** 7 pm, Jan. 6.  
Steel and concr. bridge over Straight river, 124 ft. long, 34 ft. wide, with two 8-ft. walks, lamp-posts—J. H. A. Graetz, 506 Chamber of Commerce bldg., St. Paul.

**Minn., Appleton.** Dec. 15.  
Bridge on Franklin st.—H. W. Steele, vil. clk.

**Minn., Roseau.** 4 pm, Dec. 10.  
2 hwy. bridges across Roseau river, consisting one 132-ft., 4-span bridge and one 99-ft., 3-span bridge—E. V. Willard, comr. drainage and waters, Old Capitol, St. Paul.

**Minn., Bemidji.** 2 pm, Dec. 12.  
Constructing 80 bridges and furnishing and installing 76 metal culverts on Judicial ditch no. 25, Beltrami co.—J. C. Burke, engr.

**Minn., Morris.** 2 pm, Dec. 15.  
Bridge over Pommede Terre river in Stevens co., involving rein. concr. abutment, 60-ft. low truss span, 20-ft. roadway—C. R. Wollpham, co. aud.

**Neb., Pierce.** Dec. 15.  
Bridges in Pierce co. for 1920—F. H. Mohrman, co. clk.

**Neb., Ainsworth.** 9.30 am, Dec. 16.  
Bridge across Niobrara river—G. E. Johnson, state engr.

**Neb., Meadville.** 9.30 am, Dec. 16.  
Bridge across Niobrara river consisting of 2 standard 15-ton steel trusses, 160-ft. span, 16-ft. roadway, concr. floor on 2 concr. abutments and one concr. pier supported by steel piles—R. M. Harris, co. clk.

**N. C., Beaufort.** Jan. 5.  
2,190-ft. bridge over North river, 850-ft. bridge over Smyrna creek and 12-ft. bridge over Howland creek—L. Hooper, engr.

**O., Cleveland.** Dec. 13.  
Bridge and culverts in Chagrin Falls twp.—W. A. Stinchcomb, co. engr.

**Ore., Portland.** 10 am, Dec. 20.  
Two double leaf trunnion bascule bridges with approaches, etc. on Columbia river hwy. across Young's bay, in Clatsop co.—H. Nuhn, state hwy. engr., Salem.

**W. Va., Wayne.** 1 pm, Dec. 9.  
Bridge repairs in various streets—H. A. Levering, engr., courthouse.

**Wis., Milwaukee.** 10.30 am, Dec. 10.  
North Ave. viaduct and side approach Milwaukee river, including concr. viaduct consisting of 183 ft. retaining wall with earth fill; 142 ft. concr. beam-and-slab constr.; 141 ft. steel girders, concr. encased, over C. M. & St. P. Ry. tracks; 348 ft. concr. beam-and-slab constr.; and 571 ft. concr. arch, 3 arch spans, over Milwaukee river; total width 61 ft. 6 in. with 40 ft. clear roadway; side approach 600 ft. long and 28 ft. wide, and a stairway—Supt. bridges and pub. bldgs.

**Cuba, Santo Domingo.** Jan. 15.  
Rein. concr. bridge and approaches over Rio Yaque del Norte on road from Monte Cristi to Dajabon, in province of Monte Cristi, Dominican Republic, to consist of 2 rein. concr. cantilever arches of 100 ft. span each, 2 cantilever concr. approach spans of 42 ft. each and 2 approach fills each 200 ft. long, over all length, 314 ft. and out width 18 ft. 9 in.—A. J. Collett dir. gen. pub. wks., Dominican Republic.

## MISCELLANEOUS.

**Ark., Little Rock.** 11 am, Dec. 20.  
110.33 mi. roads in Desha co. of gravel on 5-in. sand base, or concr., or asphaltic macadam (penetration method), or warrenite, or asphaltic concr. on concr. base, as follows: sect. no. 1, 21.63 mi., involving 96 acres clearing and grubbing, 2,560 rods fence moving, 181,425 cu. yd. embankment, 2,198 lin. ft. 18 to 36-in. pipe, 728 cu. yd. concr. in pipe headwalls, culverts, and bridge abutments, beam and truss bridges, and 177,625 sq. yd. pavement, etc. Section no. 2, 40.36 mi., involving 207 acres clearing and grubbing, 1,668 fence moving, 373,425 cu. yd. embankment, 3,302 lin. ft. 18 to 36-in. pipe, 2,511 cu. yd. concr. in pipe headwalls, culverts and bridge abutments, 34,380 lbs. reinforcing metal, beam and truss bridges and trest less, and 331,412 sq. yd. pavement. Section no. 3, 16.86 mi., involving 82 acres clearing and grubbing, 970 rods fence moving, 124,815 cu. yd. embankment, 1,502 lin. ft. 18 to 36-in. pipe, 1,252 cu. yd. concr. in pipe headwalls, culverts and bridge abutments, 17,450 lbs. reinforcing metal, bridges, and 138,551 sq. yd. pavement. Section no. 4, 17.03 mi., involving 15 acres clearing and grubbing, 5,015 rods fence moving, 146,696 cu. yd. embankment, 1,310 lin. ft. 18 to 36-in. pipe, 837 cu. yd. concr. in pipe head walls, culverts and bridge abutments, 11,360 lbs. reinforcing metal truss bridges, and 139,910 sq. yd. pavement. Section no. 5, 9.26 mi., involving 30 acres clearing and grubbing, 10 rods fence moving, 66,600 cu. yd. embankment, 954 lin. ft. 24-in. pipe, 440 cu. yd. concr. in pipe headwalls, culverts and bridge abutments, 5,880 lbs. reinforcing metal, bridges, trestles, and 76,060 sq. yd. pavement. Section no. 6, 5.19 mi., involving 4 acres clearing and grubbing, 1,700 rods fence moving, 38,190 cu. yd. embankment, 314 lin. ft. 24-in. pipe, 135 cu. yd. concr. in pipe headwalls, culverts and bridge abutments, 6,050 lb. reinforcing metal, 383,868 sq. yd. pavement.—Canter & Knoch, engrg., A. O. U. W. Bldg.

**Fla., New Smyrna.** 7 pm, Dec. 16.  
3,000 ft. flume, 9 ft. wide, involving 2,780 lin. ft. rein. concr. slabs, 1260 cu. yd. cement rubble masonry; or 335 lin. ft. rein. concr. slab, 2,445 concr. or segment blk. arch and 291 cu. yd. cement rubble blk. or gunite constr.—Williams & Collier, engrg., Sanford.

**la., Sac City.** 10 am, Dec. 15.  
Constr. of drainage dist. no. 73, tile, catch basins, etc.—F. W. Moyer, co. aud.



**Minn., Elbo Lake.**

Cleaning and repairing co.; ditch no. 8, involving 14,500 cu. yd. excav.; clearing and grubbing trees and brush; and repairing bridge foundation—C. M. Nelson, co. aud., Grant co.

**Mo., St. Louis.**

11 am, Dec. 26. 450,000 cu. yd. earthwork (327,000 cu. yd. hydraulic fill in old borrow pits, and 123,000 cu. yd. levee enlargement) in Sny Island Levee Drainage Dist., Ill.; also 260,000 cu. yd. earthwork (172,000 cu. yd. hydraulic fill in old borrow pits and 88,000 cu. yd. levee enlargement) in Hunt Drainage Dist.—Secy., Mississippi River Comm., 1311 Internat'l Life bldg.

**Neb., Wahoo.**

10 am, Dec. 15. Box culverts, pipe culverts and incidental work on fed. aid road in Saunders co., involving 241 cu. yd. concr. in one 6x6-ft. box culvert; 682 cu. yd. concr. in pipe head-

walls; 64 ft. 24-in. and 32 ft. 36-in. concr. pipe—G. E. Johnson, state engr., Lincoln.

**N. Y., Buffalo.**

11 am, Dec. 9. Furnishing 50 trailers to be used for hauling ashes and garbage, 5-ton capacity, each, water tight bodies, rubber-tired, bodies to dump from side—Bureau of Streets.

**N. Y., Albany.**

noon, Dec. 16. Constructing freight house and placing and compacting gravel surfacing on terminal site at Rochester in connection with Barge canal terminals constr.—E. S. Walsh, supt. pub. wks., Capitol.

**N. Y., Albany.**

noon, Dec. 23. Work on barge canal terminals, involving furnishing and installing four 3-ton electric semi-portal revolving jib cranes on barge canal terminals, 2 each at Greenpoint—E. S. Walsh, supt. pub. wks., Capitol.

**O., Toledo.**

noon, Dec. 9. Contr. no. 1 of Ten Mile Creek intercepting sewer, consisting of a 72-in. circular sewer, 17,080 ft. long and one 1,400 ft. long, manholes and appurtenances—D. H. Goodwillie, dir. pub. serv.

**Wash., Seattle.**

noon, Dec. 79. Dredging and rock excav. in Willapa river and harbor, Wash.—U.S. Engr. Office.

**W. Va., Wheeling.**

11 am, Dec. 16. Furnishing gate-operating machinery for dams nos. 23,25 and 27, Ohio river—U. S. Engr. Office.

**Wis., Manitowac.**

4 pm, Dec. 15. Furnishing one 3-ton truck, rear wheel drive type, dump body of 3 cu. yd. capacity and hydraulic hoist; one 3-ton truck, wheel drive type, dump body of 3 cu. yd. capacity and hydraulic hoist—A. H. Zander, city clk.

## BIDS RECEIVED AND CONTRACTS AWARDED

### STREETS AND ROADS

**Ariz., Yuma**—Yuma co. authorized \$1,600,000 bonds for improving roads.

**Ariz., Kingman**—Election planned in Mohave co. on \$300,000 road and bridge bonds.

**Ark., Walnut Ridge**—It is proposed to construct Walnut Ridge-Hexie-Alicia road. A. C. Briggs, local engr.

**Cal., San Francisco**—Basalt blk. paving in Eight st. was recommended by Draymen's Ass'n and approved by Bd. Pub. Wks. Work will cost \$13,100.

**Cal., Chico**—\$1,700,000 bonds for improving roads will be voted in December.

**Cal., Oakdale**—Chamber of Commerce is planning impvt. program including paving West Railroad st.

**Cal., Yuba City**—Sutter co. plans oil macadam road. \$810,000 bonds voted. Address co. surv.

**Del., Wilmington**—Following roads will be placed under constr. during 1920: Naaman's road between Philadelphia pike and Faulk road between Mt. Pleasant and Boyd's corner; Roxana to Millville; Roxana to Mankford; Blades to Concord; Jacob's School to Coverdale cross roads; Georgetown to Barbours; Lewes to Five Points.

**Ga., Blue Ridge**—Election Dec. 10 on \$130,000 road constr. bonds by Fannin co. G. A. Curtis, ordinary.

**Ida., Ferdinand**—Ferdinand hwy. dist., Idaho co., voted \$75,000 road bonds.

**Ida., Potlatch**—Potlatch hwy. dist. called special election to vote on \$350,000 hwy. bonds.

**Ida., Boise**—New state hwy. connecting link in Boise to California hwy., designated by Wm. J. Hall, state comr. of pub. wks.

**Ill., Joliet**—Broadway st. will be improved at cost of \$141,144.

**Ill., Chicago**—\$2,400,000 for Western ave. widening and impvt.; \$5,400,000 for Ogden ave. extension; \$9,200,000 for widening and improving Robey st.; \$5,800,000 for widening Ashland ave. C. H. Wacker, head of plan commn.

**Ind., Indianapolis**—State bd. of tax comrs. approved \$100,000 bond issue for impvt. of Ridge road between Hammond and Gary; also \$18,000 bond issue for completing Jensen road and \$6,000 for completing Randham road.

**Ind., Vincennes**—Treas. of Knox co. will \$28,600 and \$13,900 bonds for constr. of 2 roads.

**la., Des Moines**—Construction of hwy. voted. Road will be 3½ mi. long.

**la., Davenport**—\$95,000 available in Scott co. in 1920 for primary roads.

**la., Sheldon**—City proposes to put in 45 blks. paving.

**la., Dubuque**—Dubuque co. making plans to open new road from Graf to Twin Springs which will connect Bankstone and Graf station roads.

**la., Corydon**—Wayne co. now making surveys for hard surfaced roads and bridges. H. E. Morrett, co. aud.

**la., Burlington**—City council held conference on paving Blue Grass route.

**la., Hartley**—Plans and specifications being prepared by H. R. Green, Cedar Rapids, for 20,000 yds. paving and 10,000 ft. combined curb and gutter. Bids will be taken in Jan., 1920.

**Ky., Madisonville**—Hopkins co. to vote on \$500,000 hwy. bonds.

**Ky., Princeton**—\$300,000 bond issue for roads voted in Caldwell co. Co. rd. engr.

**Ky., Prestonsburg**—\$290,000 bonds voted in Floyd co. for Old Dominion hwy. Address co. road engr.

**Mass., Watertown**—City sold \$65,000 bonds for street and drainage purposes.

**Mich., Ionia**—Ionia co. plans road building program involving 25 mi. H. Hall, Belding, and F. Knox, Portland, co. Ward comrs.

**Mich., Detroit**—Plans for widening st. and Madison ave. approved.

**Mich., Detroit**—Proposal to open Brush st., widen Michigan ave. from 60 to 100 ft., open East Warren ave., and wide Six-mile road from 66 to 86 ft., have been approved by council.

**Mich., Jackson**—Citizens voted \$1,500,000 bond issue for paving streets, extending water pipe and constructing trunk sewer.

**Mich., Big Rapids**—5½ mi. paving planned for city.

**Mich., Ann Arbor**—Washtenaw co. road comrs. will receive bids soon for road work. Appropriation, \$1,000,000.

**Mich., Cadillac**—Election contemplated on \$200,000 road bonds in Wexford co.

**Mich., Kalamazoo**—Bd. of supervisors approved \$250,000 appropriation for roads program of co. for ensuing year.

**Minn., Duluth**—St. Louis co. comrs. consider building road from Ely to Buyc, 50 mi. Cost \$200,000. W. H. Borgen, co. aud.

**Minn., Duluth**—City council's program for 1920 includes expenditure of \$1,500,000 to \$2,000,000 for pub. impvts.

**Minn., St. Paul**—City planning com. will begin plan for blvd. on 3rd st. in Dec.

**Miss., Mendenhall**—Clk. of bd. supervrs. of Simpson co. will receive bids until Dec. 2 for road bonds of \$35,000.

**Miss., Poplarville**—Plans completed for building good roads at cost of \$600,000. N. A. Kraemer, state hwy. comr.

**Miss., Poplarville**—Pearl River bd. supervrs. contemplates spending \$600,000 constructing roads. N. A. Kramer, state hwy. engr., Magnolia.

**Miss., Greenville**—City will receive bids until Dec. 1 for \$100,000 street bonds.

**Miss., Yazoo City**—Federal approval has been received for \$103,400 road proj., according to R. R. Douthan, secy., Yazoo Commercial Club.

**Miss., Purvis**—Lamar co. plans impvt. of roads within next year involving \$400,000. 36 mi additions to Jackson hwy. to be improved at cost of \$200,000.

**Mo., Bolivar**—Polk co. contemplates spending \$927,114.30 on roads during 1920.

**Mo., Neosho**—Newton co. having plans pared for building 40 mi. hard surfaced roads from Seneca to co. line, 18 ft. wide. A. C. Moore, engr., Joplin.

**Mo., Kansas City**—Ordinance providing for extension of Linwood blvd. was passed by city council.

**Mo., Jefferson City**—Total of \$15,562,000 for permanent roads has been voted by Missouri cos; \$2,139,000 more is proposed in pending bond elections; besides this are proposed bond issues carrying \$18,516,000.

**Mo., Versailles**—Morgan co. voted bonds of \$300,000 for road.

**Mo., Jefferson City**—St. Louis co. court and state hwy. bd. agreed to improve 4 hwy. in co. at cost of \$2,000,000. A. Graham, state hwy. engr.

**Mont., Baker**—Clk. of Fallon co. will receive bids until Dec. 1 for \$275,000 road bonds.

**Mont., Hardin**—Resolutions of intention to create six impvt. dists., 3 mi. paving, adopted by city council. Work not to begin before spring.

**Neb., Norfolk**—City contemplates paving 121 blks. to cost \$100,000, according to city engr. Tracy.

**Nev., Reno**—Plans for constructing permanent hwy. across Nevada into Northern California will be discussed by convention.

**N. J., Elizabeth**—City council passed ordinance to grade and improve 6 streets.

**N. J., Atlantic City**—W. J. Bushby, state hwy. comr., has approved paving 20 mi. road with concr. at cost of \$500,000.

**N. J., Cranford**—Civic board passed resolution approving plans of twp. committee to spend \$300,000 for road impvts.

**N. J., New Brunswick**—City comrs. appropriated \$141,400 for improving streets during 1920.

**N. J., Elizabeth**—Bd. works petitioned council for improving Linden ave. at \$30,000; Chilton st. at \$13,025; High st. at \$1,637.95; Magnolia ave., \$18,147.

**N. Mex., Santa Fe**—Dept. Agriculture approved fed. aid proj. for 6 mi. road in Sandoval co., to cost 48,378.

**N. Mex., Santa Fe**—Plans being prepared for fed. aid projects nos. 32 and 33. Address L. A. Gillett, state hwy. engr.

**N. Y., Sidney**—Proposition circulated asking election on \$75,000 macadam road bonds.

**N. Y., Albany**—State hwy. comr. F. S. Greene designed 172 roads for constr. next year. Contracts will be awarded during Dec., Jan., Feb., Mar. and Apr. Total number mi. planned is 725.5, of which 527.26 mi. will be concr.

**N. Y., Albany**—City council passed ordinances directing grading and improving 5 streets.

**N. Y., Oswego**—Concr. road in Erie st. as called for in \$100,000 bond for improved pavements, will be started next summer.

**N. Y., Newton**—Local bd. passed resolution appropriating \$25,600 for improving 2 streets.

**N. Y., (L. I.) Huntington**—Gold Spring Harbor will have several hwy. impvts. Bd. approved appropriations for White Hill rd. and Huntington ave. work.

**N. Y., Ithaca**—City considering issuing \$110,000 street impvt. bonds.

**N. C., Monroe**—M. C. Long, clk. of bd. of Union co. comrs., will receive bids until Dec. 1 for \$100,000 road and bridge bonds.

**N. C., Winston-Salem**—Election on \$2,000,000 to \$5,000,000 road bonds in Forsyth co. Address co. clk. Hard-surfaced road to be built between Winston-Salem and Greensboro. Co engr. gives estimate \$500,000.

**N. C., Asheville**—Comrs. of Yancey and McDowell cos. ordered location survey for proposed hwy. from Marion to Micaville. Hard surfaced road to be built.

**N. C., Rutherfordton**—Fed. govt. has approved plan for 16-ft. concr. road.

**O., Cincinnati**—City council passed ordinance providing for sale of \$40,900 bonds for improving eight streets.

**O., Sidney**—Comrs. will have \$90,000 in spring for road impvts. in Sheloys co.

**O., New Lexington**—Perry co. will have \$75,000 next year for roads, according to co. bd. of comrs.

**O., Sandusky**—Surveying and estimating costs of constructing 6.6 mi. paving on Milan Klyria road and 2.6 mi. on Lima-Sandusky road will begin immediately, Surveyor Schultz announced.

**O., Evold**—City voted \$385,000 street impvt. bonds. H. S. Dunlop, clk.

**O., West Union**—Adam co. comrs. will arrange for constr. of Main Market road; 26 mi. W. R. Mawrey, chn. of comrs.

**O., Canton**—Arrangements for paving three streets at \$40,000 are being made. Water main extensions to cost \$15,000 are being arranged.

**O., London**—Bonds of \$55,000 for paving and grading and lighting two streets have been sold.

**O., Canton**—Co. comrs. begin plans for paving Lincoln hwy. between Canton and Massillon.

**O., Lima**—Planned to improve 9 mi. Elida road and 8 mi. Marion road.

**O., Akron**—Comrs. have announced 1920 road bldg. program will include paving all gaps in inter-county hwy. and general impvts other co. roads .30 mi. impvt. will be undertaken.

**O., Cleveland**—Road bldg. programs of state for 1920 announced as follows: Piquette co.; 5 mi. waterbound macadam, Mt. Vernon, 17 mi. paving; Marietta, 3 mi. conor. hwy.; Lisbon, 3 mi. brick road; Tiffin, 16 mi.

**O., Akron**—Co. Engr. C. J. Costigan has begun survey and will prepare plans and specifications for 14 mi. roadway in co.

**O., Marietta**—State Hwy. Comr. approved building additional stretch of 4 mi. conor. roadway on Marietta Colchwell route.

**O., Salem**—With \$2,000,000 road levy sanctioned, Columbia co. comrs. are preparing to proceed at once with permanent impvt. of 102 mi. co. roadway.

**Okl., Muskogee**—Muskogee co. has authorized \$1,000,000 road bonds.

**Okl., Antlers**—\$158,000 twp. road bonds authorized.

**Ore., Heppner**—Bids for Morrow co. road bonds of \$170,000 were awarded.

**Ore., St. Helena**—Columbia co. will probably spend \$250,000 on roads during 1920.

**Ore., Oregon City**—Clackamas co. to vote Nov. 24 on \$1,700,000 road bonds.

**Pa., Franklin**—Venango co. voted million dollar bond issue for good roads.

**Pa., Germantown**—City council received request for paving 8 streets.

**Pa., New Castle**—Voters authorized \$1,000,000 bonds for road impvts. in Lawrence co.

**Pa., Harrisburg**—Following cos. issued bonds for constr. of secondary hwy: Bradford co., \$1,000,000; Indiana co., \$1,000,000; Venango co., \$1,000,000; Lawrence co., \$1,000,000; Lycoming co., \$500,000.

**S. C., Greenville**—20 mi. Jones Gap rd. will be constructed; \$60,000 fed. aid. State hwy. dept., Columbia.

**S. C., Lexington**—Lexington co. bd. supervrs. will build 30 mi. sand clay rd. between Batesburg and Columbia, 40 ft. wide. \$100,000.

**Tenn., Jacksboro**—Campbell co. will give \$100,000 and state gov. \$200,000 for constructing 39 mi. Dixie hwy. from Ander co. line to Jellico, M. A. Wheeler, chn, Campbell co. hwy.

**Tenn., Camden**—Benton co. has voted \$200,000 road bonds.

**Tenn., Memphis**—Louisiana voted \$250,000 bond issue for constr. of 40-mi. link of Mississippi River Scenic hwy. Bonds will be supplemented by state and fed. aid to sum of \$200,000. T. B. King, pres. Hwy. Ass'n.

**Tex., Bonner**—\$125,000 road bonds issue recently voted.

**Tex., Amarillo**—\$750,000 will be spent on Potter co. roads during coming year, and \$500,000 on streets of Amarillo.

**Tex., Itasca**—Itasca co. will spend \$350,000 on good roads and \$150,000 for 36 mi. pike roads secured by former bond issue.

**Tex., Gainesville**—Att'y gen. passed favorably on \$200,000 bond issues for building roads in Valley View dist.

**Tex., Gatesville**—In Coryell co. movement was put on foot for \$1,000,000 bond issue for roads.

**Tex., Orange**—Orange co. road and bridge proj. will involve \$1,200,000. expenditure.

**Tex., Pulaski**—See "Water Supply."

**Tex., Clarendon**—City Engr. Caraway has plans for new paving proj. for 18 blks. through residence section, to cost \$75,000.

Complete plans call for large market square in heart of city to be paved.

**Tex., Stamford**—Att'y. Gen. recently approved city's \$20,000 st. impvt. bonds.

**Utah, Salt Lake City**—30 mi. road planned between Huntsville and Woodruff. Address I. R. Browning, state rd. engr.

**Va., Tenn., Bristol**—Ordinance authorizing sale of \$100,000 street bonds was passed at meeting of Virginia comrs.

**Va., Richmond**—\$400,000 set aside for new constr. on Roanoke to Petersburg road passing through Lynchburg; \$80,000 for Ward's road.

**Wash., Seattle**—City engr. will prepare plans for changing street grades and street railway lines. Est \$16,000,000.

**Wash., Seattle**—Grading and road constr. planned to cost \$350,000. Bids will be asked in spring for surfacing Richmond Beach road and paving Redmond-Hollywood road, 4 mi. Est. for 2 roads, \$180,000.

**Wash., Chehalis**—It is proposed to improve hwy. from Winlock by 18 ft. conor. pavement.

**Wash., Spokane**—Comrs. of Spokane co. will receive bids until Dec. 9 for \$450,000 road bonds.

**Wash., Tacoma**—Pacific ave. will be paved at once to cost \$138,000.

**W. Va., Charleston**—City council will soon advertise for bids for paving.

**W. Va., Bluefield**—A trans-state hwy. from Atlantic coast to Kentucky border at Cumberland Gap and penetrating heart of West Virginia has been planned by state hwy. ass'n. \$2,663,227 expenditure contemplated. From Lebanon another road is planned through Russell and Tazewell cos. to Tazewell co. line.

**W. Va., Warwood**—\$150,000 bond issue for streets and sewers is voted.

**Wis., Superior**—Douglas co. voted Nov. 4 on \$1,200,000 serial road bonds.

**Wis., La Crosse**—It is proposed to issue \$2,500,000 bonds for roads in La Crosse co.

**Wyo., Cheyenne**—Bids will be received between Jan. 1 and Mar. 10, 1920, for following work: Dist. No. 1, R. E. Thomas, dist. engr., Cheyenne, Goshen co.—Cheyenne-Torrington rd., 10 mi. north Laramie co. line; Platte co., Yellowstone hwy.; Laramie co., Lincoln hwy., 8 mi.; Torrington rd., Cheyenne to county line. Dist. No. 2, R. V. Newcomb, dist. engr., Rock Springs, Carbon co.—Lincoln hwy., 28 mi.; Sweetwater co., Lincoln hwy., 14 mi. Dist. No. 4, R. L. Silver, dist. engr., Basin, Big Horn co.—Lovell to Cowley, and Lovell to Germania, 3 mi.; Park co.; Yellowstone hwy. Cody to Pearsons; Yellowstone hwy. near Dry Creek, Mectelsee, 5 mi.

**N. B., St. John**—Comr. Fisher submitted to city council program of street paving for 1920 involving expenditure of \$1,000,000.

#### BIDS RECEIVED AND CONTRACTS AWARDED.

**\*Ala., Birmingham**—Contr. awarded Dunn Constr. Co., this city, to pave Tuscaloosa ave. with sheet asphalt; \$67,147. J. Kendrick, city engr.

**\*Ark., Harrisburg**—\$1,250,000 worth of road work has been contracted for by comrs. of Poinsett, Greene and Craighead cos., to be used on single road traversing the 3 cos. J. R. Scott of St. Louis was successful bidder.

**\*Cal., Sacramento**—Proposed paving in Tehama co. was awarded to Lynn S. Atkinson, Sacramento, at \$53,489.50. Ventura co. contr. awarded G. R. Curtis, Los Angeles, \$114,250. H. H. Lienau, Redland, awarded San Bernardino-Riverside co. job at \$63,662.75.

**\*Cal., Red Bluff**—Tehama co. bd. supervrs. awarded contr. for spreading crushed gravel on Manton road to M. E. Edwards, at \$1.50 per sq. yd.

**\*Ida., Twin Falls**—City council let 12 mi. paving to Warren Constr. Co., Portland, Ore., at \$738,627.90 for bitulithic paving. C. H. Mull bid \$7,000 more.

**\*Ind., South Bend**—Contr. for Donovan road in Portage twp., St. Joseph co. has been awarded White Constr. Co., South Bend, at \$31,500.

**\*Ind., New Albany**—Contr. for constructing New Albany and Jasper rd. let by Floyd co. comrs. at \$33,000 to J. E. Hodgins, New Albany.

**\*Mich., Lansing**—State hwy. comr. awarded following contracts: Freeman Lumber Co., Engadine, 4,223 mi. C stone-gravel—\$50,208; A. Mitchell, Boyne City,

3,407 mt.—\$21,372.90; Traverse Co. Comrs. Traverse City, 1 mi. B. gravel road—\$9,500.

**\*Mo., Kansas City**—Contr. for 2½ mi. paving on blvds. awarded by park bd. as follows: Rockhill road—McTernan-Halpin Constr. Co., at \$2 per sq. yd.; Meyer blvd.—C. E. Greenwood, at \$2.30 per sq. yd.; Meyer blvd., from Oak st. to Paseo—F. M. Duncan, at \$2.30 per sq. yd.; Brookside blvd.—J. L. Miller, at \$2.14 per sq. yd.; and Ward Parkway—H. H. Scott, at \$2.09 per sq. yd. All specifications call for bituminous macadam paving.

**\*N. J., Elizabeth**—Contr. for repaving Cherry st. with granite blks. on conor. base, awarded by bd. wks. to Newark Paving Co. at \$86,212.37.

**\*N. J., Camden**—Cape May City comrs. awarded Sutton & Corson Co., Ocean City, for \$68,000, contr. to pave with conor. Perry st., Jackson st. and parts of Ocean and Decatur streets.

**\*O., Washington**—Council awarded Andrews Asphalt Paving Co., Hamilton, contr. for resurfacing paved streets in business section at \$43,000.

**O., Columbus**—Following bids received Nov. 14: No. 2 Bellefontaine-Wapakoneta rd.—Radebaugh & Graham, Columbus, \$125,078; C. F. Smith & Sons, Dayton, \$126,481.42; No. 3 Bellefontaine-Wapakoneta—Radebaugh & Graham, \$138,633; C. F. Smith & Sons, \$140,312.34; No. 4 Hillsboro-Washington rd.—Fayette Sand & Gravel Co., Washington C. H., \$14,233.70; Bean & Co., Highland, \$45,461.51. No. 5 Jefferson co., Ohio river road—Flot Bros. Constr. Co., Steubenville, \$11,450.85. No. 6 Lucas co., Perrysburg-Holland road—M. P. Hannan, Toledo, \$38,854.41; Peter Bros. & Co., Toledo, \$39,980. No. 7 Lucas Co., Water-Swanson rd., contracts No. 1 and No. 2—R. C. Roach & Sons, Waterville, \$59,588.32 and \$33,449.48; M. P. Hannan, Toledo, \$57,381.60 and \$32,349.30. No. 8 Marion-Maryville rd.—Foster, Reigert Constr. Co., Dayton, conor. \$46,374.83; bit. mac. \$34,252.37; W. K. Drake, Marion, conor. \$47,993.25. No. 10 Van Wert-Rochford rd.—Foster, Reigert Constr. Co.—\$68,218.58; E. Cammar, Dayton, \$69,888.25. No. 11 McConnellsville-New Lexington rd.—H. D. Curtis, Greenville, \$87,941.50; S. A. Palmer, Marietta, \$88,333.64. No. 12 Mt. Gilead-Galion rd.—S. W. Conley, Eaton, \$83,370.07; J. S. Edwards, Sunbury, \$83,615.78. No. 14 Columbus-Washington C. H.—E. W. Botkin, Ada, type A—\$96,735.76, type B—\$89,499.56; G. W. Bergman, Columbus, type A—\$95,360.56. No. 16 Canton-Canal Dover—Seiple & Wolf Constr. Co., Youngstown, \$60,047.48.

**\*Ore., Portland**—State Hwy. Comm. awarded contracts for following rd. work: Prineville-Crooked River section—A. Guthrie & Co., \$199,588.06; iron pipe \$202,125.20; other bidders—Sims & Carlson, conor. pipe, \$207,021; N. W. Constr. Co., iron pipe, \$217,045.45; conor. pipe, \$219,339; engr's estimate, \$221,095. Prineville-Redmond section—Oscar Huber, conor. pipe, \$73,417.28; other bidders were Sims & Carlson, iron pipe, \$83,746.50; conor. pipe, \$84,511.20. Bend-Allen Ranch section—O. Huber, \$25,019; engr's estimate, \$26,835. Klamath Falls-Merrill section—O. Huber, conor. pipe, \$155,032.50; engr's est., \$181,070.45. Klamath Falls Dairy—O. Huber, r.o.b. gravel, conor. pipe, \$146,008.16; other bidders, Klamath co. court, \$183,452; engr's est., \$144,236.40. Algoma section—O. Huber, cinders, conor. pipe, \$124,422.020; broken stone macadam, conor. pipe, \$125,632.20. Cow Valley-Erogan section—Morrison Knudson, iron pipe, \$81,154.40; conor. pipe, \$92,277.330; other bidder, Pacific Bridge Co., iron pipe, \$92,147.30; conor. pipe, \$92,277.30; engr's est., \$78,475. Pendleton-Cabbage Hill section—Clifton, Applegate & Toole, conor. pipe, \$100,701.46; iron pipe, \$100,924; other bidder, Porter & Conley, iron pipe, \$102,496; conor. pipe, \$102,721.50; engr's est. \$115,961.70. Bend-Jefferson co. line section—O. Huber, conor. pipe, \$84,942.50; other bidder, Ward & Logan, iron pipe, \$92,188.48; conor. pipe, \$92,344.

**\*Pa., Harrisburg**—Contracts for road constr. in Beaver and Clearfield cos. awarded by state hwy. comr. L. S. Sadler, as follows: Beaver co. contr. to Chester General Contracting Co., East Liverpool, O., at \$66,490.47; impvt. consists of 5.195 ft. rein. conor. constr. Fillord & Pritchard co., Phillipsburg, awarded two Clearfield contracts. Route 234, connecting Clearfield and Hollidaysburg, 11,222 ft. rein. conor., at \$97,224.65; and 5,400 ft. near Madera, at \$56,569.50.



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\*S. C., Spartanburg—Contr. awarded Southern Paving Constr. Co., Chattanooga, Tenn. for 100,000 sq. yd. street paving; asphaltic concr., sheet asphalt and brick, each on 4-in. concr. base. \$239,000.

\*Tex., Odessa—Contr. for constructing 9 mi. road through sand in western part of co. was awarded to Lee Moor Contracting Co., El Paso.

\*Tex., McKinney—Contr. let for 25 mi. hard-surfaced roads for Exall hwy. through Collin co., to F. D. Perkins, this city.

\*W. Va., Wayne—Wayne co. comrs. let contr. for grading 7 mi. Wayne-Fort Cay road at \$111,342.

## SEWERAGE.

Cal., San Francisco—Finance committee of bd. supervrs. approved request that \$13,700 be made available for constr. of sewers through Presidio.

Colo., Boulder—City passed ordinance providing for sewer constr. in Impvt. Dist. no. 2.

Ida., Rupert—\$60,000 bonds will be sold at once and bids asked for extension to sewer system. Engr. Kelsey.

Ida., Buhl—Sewer bonds aggregating \$87,000 carried.

Ill., Fairbury—Plans being drawn for constr. of storm and sanitary sewer system and disposal plant. Cost \$100,000.

Ill., Chicago—Sanitary Dist. passed Bubbly Creek bill providing sewage disposal plant at stockyards. W. G. Clark, trustee.

Ia., Winfield—5 mi. sewers and sewage disposal plant planned. Bids to be taken in Jan., 1920. Plans to be prepared by H. R. Green, engr., Cedar Rapids.

Kan., Pittsburg—Bids received after Dec. 1 on storm sewers. Est. \$50,000. L. E. Curkman, engr.

Ky., Louisville—Citizens voted sewer bond issue of \$2,000,000. Begin work soon.

Mich., Detroit—Vast sewer bldg. program has been outlined by City Engr. Hubbell.

Mich., Dearborn—\$87,000 sewer bonds sold.

Mich., Port Huron—City having plans and est. prepared for sewer in Porter, Howard, Farley Ballentine sts., involving 7,900 ft. 8-10-in. vitr. crock sewers with brick manholes and special connections. \$24,000. E. R. Whitmore, city engr.

Minn., Hutchinson—City receives bids about January, building sewers in 40 blks. \$100,000. J. W. Shaffer & Co., N. Y. Life bldg., Minneapolis, engr.

Minn., Duluth—City council ordered sewer to be constructed at cost of \$15,267.

Miss., Greenville—City clk. will receive bids until Dec. 1 for \$75,000 sewer bonds.

N. J., New Brunswick—City comrs. appropriated \$25,000 for sewer constr. during next year.

N. J., Atlantic City—Plans have been adopted in city engr.'s office for draining storm waters from West Side.

N. C., Jacksonville—Onslow co. voted bond issue to install sewerage system and water works. Bids received soon.

N. C., Sylva—Ordinance passed providing for sewer system bonds of \$20,000.

O., Bellefontaine—Council passed ordinance to issue \$92,000 water works impvt. bonds.

O., Sebring—Council will take up question of enclosed sewage disposal plant and filtration plant.

O., Middletown—Bids received until Dec. 19 on \$20,000 sewer bonds for city.

Ore., Bend—Council approved plans for \$133,000 extension of sewer system.

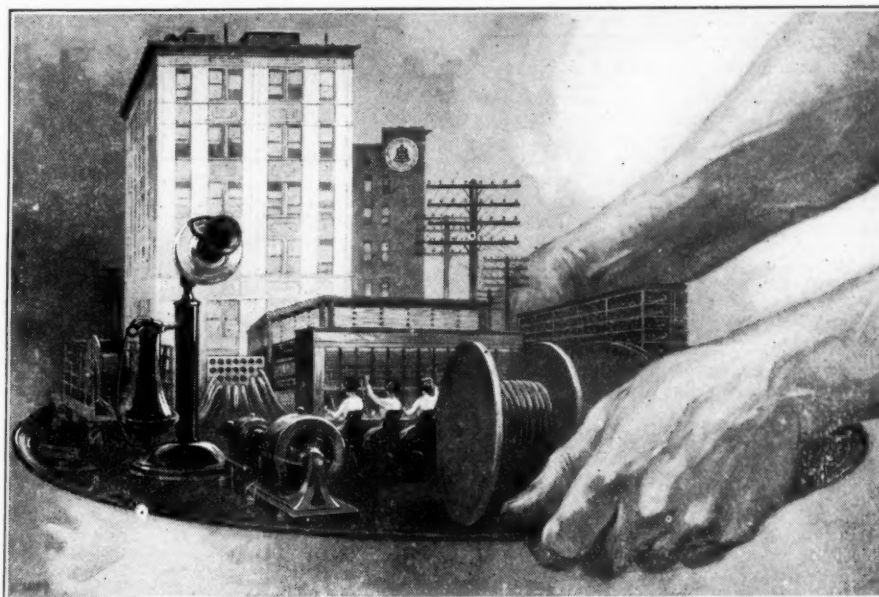
Ore., Klamath Falls—Ratification of \$50,000 bond issue to build sewer mains and septic tank will be sought at special election Nov. 28.

Pa., Wesleyville—\$69,000 bonds authorized for constructing sewer system and sewer disposal plant. H. A. Thomas, clk. of council.

S. C., Orangeburg—\$50,000 bonds for sewer extension carried. F. O. Dibley, city clk.

Tex., Alpine—Citizens voted \$35,000 bonds for constructing sewer.

Tex., Shreveport—Proposition to issue \$100,000 bonds for providing additional equipment for local water works and sewerage system was carried.



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Va., Potomac—\$60,000 sewer bonds authorized at recent election.

Wash., Yakima—Bonds of Drainage Dist. no. 1, \$55,000, sold to Union Natl. Bank, Seattle.

Ont., Hamilton—City engr. E. R. is completing plans for overflow sewer system to cost \$300,000.

\*Mo., Kansas City—Contracts for 2 sanitary sewers were awarded to Kinlen Constr. Co., \$6,000, and Fred Lorimer, \$16,000, respectively.

O., Warren—H. J. Poff, 1216 Youngstown ave., is low bidder for constr. of West end truck sewer and South Tod sewer at \$30,000.

\*O., Canton—Bd. Contror awarded Kellers & Huff contr. for building receiving basin, 1,500,000 gal. capacity, at Dan Smith's farm, at \$46,700.

\*Tex., Port Arthur—City let contr. for erection of water tower to Pittsburgh-Des Moines Steel Co., Dallas. Tank is to be of steel and have 300,000 gal. capacity. Cost, \$24,000.

### BID RECEIVED AND CONTRACTS AWARDED.

\*Ia., Des Moines—City council voted to accept Herrick's bid of \$2.47 a ft. for contr. no. 1 and Alexander & Higbie's offer of \$4.97 a ft. for contr. no. 2, including pumping station, on constr. of South Side sewer.

## WATER SUPPLY.

**Cal., Sacramento**—City having plans prepared by G. J. Calder, constr. engr., building water filtration plant. About \$1,500,000. C. G. Hyde, constg. engr.

**Colo., Fleming**—\$40,000 water bonds have been sold.

**Del., Wilmington**—Bids for constructing pumping plant with 50,000,000 gal. a day capacity, to supply Chesapeake and Delaware canal, will be called for noon by U. S. Engr. office here. Est. \$30,000.

**Ill., Virden**—Election resulted in issuing \$500,000 water system bonds.

**Ill., River Forest**—Vil. is contemplating increasing water supply by sinking new well or wells. Would be pleased to receive suggestions as to its needs to be embodied in specifications for formal bid. 2,000-ft. well with 16-in. casing is present plan. A. S. Hatch, vil. clk.

**Ill., Chicago**—City Engr. F. S. Coombs plans to improve water supply to new William Hale pumping station, to cost \$3,165,000.

**Ind., Griffith**—\$25,000 water works bonds have been sold.

**Ia., Oskaloosa**—Citizens voted on issuing \$550,000 bonds water works impvt. bonds.

**Ky., Versailles**—Council has retained E. B. Kay for engrg. work in connection with proposed pipe line from Kentucky river. Proj. will cost \$30,000.

**La., Shreveport**—City voted to issue \$400,000 bonds for equipment of water works and sewerage system.

**Md., Baltimore**—Plans submitted for increasing city's water supply.

**Mich., Muskegon**—Citizens voted \$200,000 bonds for improving water works.

**Miss., Rolling Fork**—Election favored \$65,000 bonds for water and light impvts.

**Mo., Kansas City**—Action of city council approved purchase of 90 acres in Platte co. and ultimately city's water plant, now at Quindaro, in Kansas, will be removed to Missouri, or new plant be erected.

**Miss., Jackson**—\$15,000 bond issue to install machinery at water works plant was passed.

**Mont., Hardin**—City council calls for bids for constr. of filtration plant.

**Mont., Ekalaka**—Building water works system within next few months contemplated.

**Mont., Winnett**—\$35,000 water works bonds carried at election.

**Neb., Venango**—\$26,000 bonds for water plant voted and carried at special election. Hennessy & Co., Omaha, engr., expect to start work at once.

**N. J., New Brunswick**—Ordinance passed providing \$161,000 bond for additional constr. of water supply system.

**N. C., Fayetteville**—\$200,000 bonds for water, street and bridge impvt. awarded.

**O., Greenville**—Commercial Club requested council to furnish plans and estimate for rebuilding water works plant. Bond issue to be submitted. Filtration system favored and change in location of pumping station is proposed.

**O., Wapkeneta**—Wm. Dill, chf. engr. of water and light plant, states that boiler and engine capacity is inadequate and must be immediately increased.

**O., Youngstown**—\$600,000 bonds to be used in new water mains was voted by council.

**O., Middlefield**—\$30,000 water works bonds voted. E. C. Reid, clk.

**Okla., Clinton**—City voted \$350,000 bonds for water supply. W. A. Shouse, city clk.

**Okla., Tonkawa**—\$60,000 bonds voted for water works extensions; Johnson & Benham, constg. engrs., Firestone bldg., Kansas City, Mo.; also bonds for electric light impvts., \$15,000.

**Ore., North Powder**—Recent election authorized \$330,000 water works bonds.

**Ore., Monmouth**—Morris Bros., Portland, awarded issue of \$60,000 water bonds.

**Pa., Bethlehem**—City council passed ordinance providing \$1,700,000 bond issue for purchase and acquisition of water works.

**Tenn., Kulaski**—City council recently employed engrg. firm of Klyce & Kackley, Nashville, to make investigations and re-

port toward improving water supply system and paving important sts. Several hundred thousand dollars worth of impvts. contemplated.

**Tex., Lubbock**—City comm. proposed \$10,000 bonds for additions to water works system.

**Wash., Anacortes**—Resolution introduced in council providing for installation of 10-in. water main along certain city streets, to cost \$12,000 city engr. preparing plans.

**Can., Toronto**—Comr. of Works R. C. Harris is interested in instruments for locating leaks in water pipes.

## BIDS RECEIVED AND CONTRACTS AWARDED.

**\*Tex., Beaumont**—Contr. for addition to filtration equipment by which water works will be increased one-third, was awarded Jewel Filtration Co.

## LIGHTING AND POWER.

**Ala., Gadsden**—Election Jan. 6 on \$100,000 municipal bonds for electric light plant, etc. E. Smith, city engr.

**Fla., Bradentown**—City contemplates \$16,000 bond issue for municipal power plant.

**Fla., Jacksonville**—Additional impvts. of municipal electric light plant contemplated. J. S. Bond, chn., city comm.

**N. Y., Bath**—Proposition to issue \$35,000 electric light bonds recently voted upon.

**O., Columbus**—City council passed ordinance appropriating \$15,000 for extension to municipal light plant.

**O., Troy**—City aud. C. E. Rannels will receive bids until Dec. 6 for \$74,000 electric light bonds.

**S. C., Laurens**—Watts Mills will install electric lights throughout vil. streets and housing. J. E. Sirrine, engr., Greenville, S. C.

**S. Dak., Yankton**—City contemplates extensive impvts. for local and light power system.

**Tex., Bryan**—Att'y Gen. approved \$75,000 city of Bryan power plant bonds.

## FIRE EQUIPMENT.

**Ariz., Phoenix**—Fire chf. W. D. Simmons petitioned for fire station and additional apparatus.

**Cal., Huntington Park**—\$10,000 will be spent for five apparatus.

**Ill., Benton**—City voted \$40,000 fire dept. bonds.

**Mass., Conasset**—Motor fire apparatus is to be added to equipment of dept.

**Mich., Lansing**—City council passed resolution appropriating \$60,000 for erection and equipment of fire house.

**Minn., Tyler**—Motor fire apparatus will be purchased.

**Mo., St. Louis**—Bill providing \$300,000 appropriation for electrification of lighting system will be introduced in Board of Aldermen soon.

**O., East Liverpool**—\$13,000 bonds for fire equipment had been sold.

**O., Akron**—Fire dept. bond issue of \$166,000 is carried.

**Okla., Cushing**—Election favored issuing fire equipment bonds of \$10,000.

## BRIDGES.

**Del., Wilmington**—Bridge to be built at Washington st. and street to be widened.

**D. C., Washington**—House passed bill authorizing constr. of bridge from Chinco-teague Island, Va., to mainland. Bridge to be 5 to 7 mi. long.

**Ind., Indianapolis**—State bd. of tax comrs. authorized Marion co. to issue \$200,000 bonds for building bridges over Eagle creek and several smaller streams in county.

**N. J., Atlantic City**—Co. engr. will prepare plans for 3 bridges on Meadow blvd. Est. \$500,000.

**O., Akron**—Voters favored \$250,000 bonds for constructing State st. viaduct.

**O., Sandusky**—Co. comrs. recommend new bridge to replace one at State st.

**O., Ashland**—\$35,000 bonds have been sold.

**O., Youngstown**—\$175,000 bond issue for Lanterman Falls bridge carried.

**O., Youngstown**—Legislation authorizing serv. dir. to contr. for constructing Oak st. bridge introduced into council. Plans

**O., St. Clairsville**—B. W. Hopkins, clk. of Belmont co., states that constr. of bridge at McCann creek costing \$20,000 is under consideration.

**O., Marietta**—Co. comrs. plan constr. of concr. bridge on west of Muskingum.

**O., Warren**—Co. comrs. requested to give high level bridge proj. at Girard immediate attention.

**Pa., Bethlehem**—Pub. serv. comm. of state has apportioned cost of city's great new bridge, and directed that bids be at once received for constr. Est. \$2,315,000.

**Pa., Harrisburg**—State is planning immediate constr. of State st. Memorial bridge.

**Pa., Williamsport**—Lycoming co. voted favorably on proposed \$500,000 bond issue for bridge and road work.

**Pa., Beaver Falls**—Plans for constr. of bridge on 17th st. to Mt. Washington recommended by chamber of commerce. J. T. Reeve, chn. of committee.

**Tex., Galveston**—Co. Engr. Sias was instructed to prepare specifications for replacing Perthuis bridge over Highland bayou, co. to furnish material. Bids will be advertised as soon as specifications are drawn.

**Tex., Rockwall**—Plans approved for concr. bridge over Trinity river. Address J. K. Wells, co. judge of Rockwall co.

**W. Va., Spencer**—H. R. Muldoon, co. engr., has plans for 4 bridges to be constructed in various parts of Roane co. These will be shortly be advertised by G. Whitney, press., bd. comrs.

**Wis., Luxemburg**—Plans will be prepared by State Hwy. Comm. for concr. girder bridge. Est. \$15,000. Address Moses Shaw, co. hwy. comr., Algoma.

**Wis., Darlington**—City plans to constr. 140-ft. concr. bridge in 1920. Est. \$30,000. Address city clk.

**B. C., Victoria**—City Engr. F. M. Preston submitted report to city council recommending by-law authorizing constr. of Johnson st. bridge for vehicular pedestrian and street car traffic, cost \$420,000.

**Man., St. Anne**—Planned to spend \$109,000 for concr. bridges and culverts. Address G. E. LaRue, secy.

## BIDS RECEIVED AND CONTRACTS AWARDED.

**\*Kan., Independence**—Co. comrs. awarded contr. for building 2 concr. bridges to Western Bridge Co., Kansas City for \$36,990.

**\*Wash., Yakima**—Two bridge contracts amounting to \$25,000 have been let by bd. co comrs. to Union Bridge Co., Seattle; also contr. for constr. of Lutens arch concr. span at \$4,500.

## MISCELLANEOUS.

**Cal., Santa Barbara**—\$500,000 will be raised in this section to build first unit of proposed breakwater planned by Engr. J. R. Chapman.

**Cal., South Tule**—South Tule Independent Ditch Co. plans to build dam. About \$80,000. G. B. Sturgeon, engr., Newhall bldg., San Francisco.

**Mich., Grand Rapids**—It is proposed to submit to voters \$1,000,000 building proposition for flood protection system. G. J. Wagner, city engr.

**N., Mex. Santa Fe**—Irrigation proj. is planned for every co., involving total cost of \$600,000. A dam will be constructed at cost of \$423,750. C. O. Thorpe, state engr.

**N. Y., Albany**—Bids received at comptroller's office until Dec. 2 for whole or part of \$741,500 pub. impvt. bonds.

**N. Y., Brooklyn**—Pan-American Dock and Terminal Corporation proposed impvt. of Jamaica bay at cost of \$25,000.000.

**Pa., Pittsburgh**—Bids received until Dec. 1 on \$35,000 bonds for parks by Tarentum boro.

**Pa., Jeannette**—Boro clk. T. P. O'Connell will receive bids until Dec. 1 for \$160,000 impvt. bonds.



**LEE LINE**

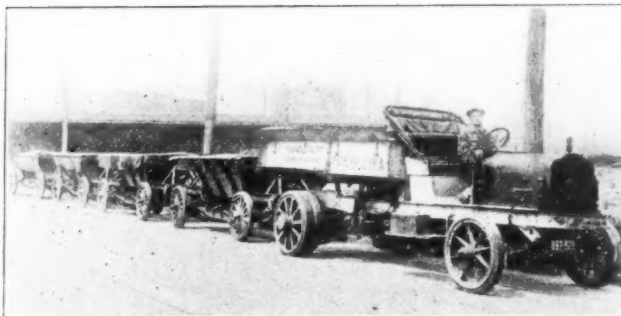


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## TO LATE FOR CLASSIFICATION

**Ala., Decatur**—Nine principal streets will be paved. Cost \$300,000.

**Ark., Pine Bluff**—Council approved plans by comrs. of 2 dists. for street paving to cost \$63,175.

**Ark., Little Rock**—Legislature passed acts providing for constr. of 8,500 mi. hard surface road, cost of which will run into millions.

**Ark., Little Rock**—City council will be petitioned for authority to form dist., streets to be paved with high-class concr. Est. cost \$40,000.

**Cal., Placerville**—Engrg. dept. of state hwy. comm. started survey of hwy. from Placerville to Sportsmans Hall, for which \$100,000 is set aside.

**Colo., Boulder**—Cost of paving for dists. no. 11 and 13 will average \$200,000 each, with additional \$100,000 for storm sewers.

**Ga., Blue Ridge**—Election Dec. 10 on issuance of \$130,000 rd. constr. bonds by Fannin co. G. S. Curtis, ordinary.

**Ia., Strawberry Point**—Plans for 38,000 yds. paving and 17,000 ft. curb and gutter have been accepted by council. Bids taken in Jan. H. R. Green, engr., Cedar Rapids.

**Ia., Dubuque**—Resolutions relative to special assessments for improving various streets and installing sanitary sewers, were adopted. Assessment for improving Main st. amounts to \$41,626.

**Ia., Waukon**—It was decided to place plan before state hwy. comm. of commencing Allamakee co.'s hard surfacing. Another proj. will start at Postville and extend north to bottom of Yellow River Valley.

**Mich., Hudson**—Proposition to issue \$55,000 street paving bonds carried.

**Minn., Duluth**—Petitions on file for impvts. to cost \$3,000,000, involving main arteries of city. J. Farrell, comr. pub. wks.

**Mo., St. Louis**—Extensive program for impvt. of streets and sewers has been outlined: Repaving Collinsville ave. with wood asphalt, \$160,000; improving Third st., \$50,000; 36th st., \$25,000.

**Mo., Richmond**—Ray co. will vote Dec. 9 on 1,300,000 road and bridge bonds.

**N. J., Asbury Park**—64 mi. co. rds., and 23 mi. state hwy. comm. turnpike, is building program outlined for co. freeholders. \$2,500,000 bond issue called for.

**N. J., Atlantic City**—Ventnor bd. of trade adopted resolution urging paving of hwy. from Absecon to Chestnut Neck.

**N. Y. (L. I.) Huntington**—Town appropriated \$630,000 for hwy. of which \$500,000 will be for building concr. roads.

**N. C., Kings Mountain**—It is planned to pave all principal streets with asphalt. Address to clk.

**O., Canton**—Stark co.'s road program for 1920 will include 22 mi. paving at cost of \$600,000, as follows: Massillon-Millersburg, 1 1/2 mi.; three-quarter mi. gap at Wilmot; 1 mi. on main market road at East Sparta; Louisville-Ravenna road, 3 1/2 mi.; Marlboro-Hartville road, 3 1/2 mi.; Canton Canal Fulton road, 2 mi.; Canton-Middlebranch, 3 mi.; Navarre-Justus, new brick top, 2 3/4 mi.; Massillon-Orrville, 2 mi.; 1 1/2 mi. at Limaville west; 2 mi. from Paris station west to twp. line.

**O., Lakewood City**—Engr. E. A. Fisher estimates cost of street extension as planned at \$75,000.

**O., Wooster**—R. V. Mooney, co. engr. is preparing plans for paving and grading Wooster Shreve road at cost of \$160,000.

**O., Defiance**—Defiance co. comrs. adopted resolutions authorizing constr. of 70 mi. concr. road at cost of \$1,650,000.

**O., Cleveland**—\$3,000,000 will be spent in paving rds. in Cuyahoga co. next year. Most important to be paving Euclid ave.

**O., Middleton**—Council recommends to comrs. following sections of roads to be improved: Seven-Mile pike, from Seven Mile to Hamilton; new hwy. from Coke Otto into Hamilton, also Colerain pike from Millville to Venice; Cincinnati and Dayton pike; hwy. from Hamilton to Venice; Middleton and Eaton pike; pike from Millville to Peoria, Ind.; Colerain-Brookville pike and Hamilton road through Princeton to Bethany; pike from Hamilton to Preble co. line; Deerfield pike to Maids; Middletown-Poststown pike, etc.

**Ore., Eugene**—Bids being asked by bureau of pub. rds. for constructing or im-

proving 15-mi. section of Blue River rd. on McKensie hwy., involving 47 acres clearing, 43 acres grubbing and 6,000 yd. rock excav.

**Ore., Portland**—State hwy. is proposed from Ontario to Jordan Valley.

**Pa., Pittsburgh**—It is planned to spend \$130,000 for widening Webster ave. Address N. S. Sprague, chf. city engr.

**Pa., Bethlehem**—City council passed ordinance providing for paving 3 streets.

**S. Dak., Mitchell**—City council received petitions for 10 mi. street paving. R. E. Davis, city clk.

**Tex., Breckenridge**—Stephens co. voted \$3,500,000 road bonds.

**Tex., Nocona**—Movement has been started to pave principal streets.

**Wash., Kelso**—Comprehensive street impvt. plan launched by city council. 2 mi. streets will be improved with concr. sidewalks and curbs.

**W. Va., Grafton**—Petitions circulated for election to vote \$1,000,000 road bonds.

**W. Va., Charleston**—Kanawha co. court has negotiated sale of \$160,000 Union dist. and \$395,000 Elk dist. bonds to state. Bonds will be ready for issue soon.

**Wis., Fond du Lac**—Special election in Fond du Lac co. for \$4,600,000 good roads bond issue. A. S. Wilkinson, co. aud.

**Wis., Medford**—11 mi. road to be built in Taylor co. to cost \$50,000.

**Wis., Waukesha**—Waukesha co. will vote Dec. 16 on \$3,600,000 bonds for constructing roads. 130 mi. concr. and 140 mi. crushed gravel.

**Wis., Madison**—City council's program for 1920 calls for \$406,895 for improving 24 streets.

**B. C., Victoria**—Petition has been presented to provincial government by J. E. Armishaw, for appropriation for building main hwy. from Campbell river, 38 mi. north to Salmon river, and erection of bridge across Campbell river.

### BIDS RECEIVED AND CONTRACTS AWARDED.

**Ga., Savannah**—Bids opened by co. comrs. as follows: Ogeechee road using 6-in. plain concr.—lowest bidder, Hadloe, \$249,521.92; other bidders—Morgan & Dixon, \$435,053.58; Brooks-Callaway, \$407,957; Lawrence Constr. Co., \$415,192; J. W. Fitzgerald, \$489,000. Ogeechee rd. using 5 1/2-in. vitrolithic concr.; Morgan & Dixon, \$475,811.58; W. T. Long Co., \$511,323. Ogeechee rd. using 5-in. concr.; Hadloe, \$349,521.92; Morgan & Dixon, \$389,128.70; Brooks-Callaway Co., \$372,950.60. Ogeechee rd. using 5-in. vitrolithic concr.; Morgan & Dixon, \$421,134.10. Louisville rd. using 6-in. plain concr.; Lawrence Constr. Co., \$266,268.60; Morgan & Dixon, \$312,312; Brooks-Callaway, \$269,268; W. T. Long Co., \$321,000. Louisville rd., 4 1/2-in. vitrolithic concr.; Morgan & Dixon, \$330,567.80; W. T. Long Co., \$360,742. Louisville rd., 5 1/2-in. vitrolithic concr.; Lawrence Constr. Co., \$245,575.40; Morgan & Dixon, \$265,163; Brooks-Callaway Co., \$246,658; W. T. Long Co., \$270,492. Louisville rd. using 5-in. vitrolithic concr.; Morgan & Dixon, \$330,567.80; W. T. Long Co., \$318,096. Fed. aid no. 103, part of Louisville rd., using 6-in. plain concr.; Brooks-Callaway Co., \$99,692.50; Morgan & Dixon, \$106,719.67; Lawrence Constr. Co., \$100,468.32; W. T. Long Co., \$109,000. Fed. aid no. 103 using 5-in. plain concr.; Lawrence Constr. Co., \$90,248.42; Morgan & Dixon, \$91,008.37; Brooks-Callaway Co., \$91,064; W. T. Long Co., \$92,078. Fed. aid no. 103 using 5 1/2-in. vitrolithic concr.; Morgan & Dixon, \$111,043.36; W. T. Long Co., \$120,600. Fed. aid no. 103 using 5-in. vitrolithic concr.; Morgan & Dixon, \$104,616.58; W. T. Long Co., \$109,276.

**\*Ia., Twin Falls**—Contr. for laying 17,000 yd. bitulithic paving let to C. H. Mull, Twin Falls.

**\*Ill., Springfield**—Following contracts awarded: Concr. and brick rd. in Vermilion co.—C. W. Clark Co., Clinton, Ind., \$83,994; two earth rds. in LaSalle co.—Powers Thompson Constr. Co., 221 S. Chicago st., Joliet, Ill., \$134,362; 3 concr. rds. to Powers Thompson Constr. Co., \$647,572; two concr. rds. in Madison and Bond cos.—Highland Lumber & Constr. Co., Highland, Ill., \$112,410.50 and \$110,632.88 respectively; two concr. rds. in Bond co., \$273,500 and \$110,167.34.

**Ind., Indianapolis**—Following bids received for part of Osgood-Versailles rd.:

Shields & Bligh, Seymour, low bidders on hwy. comm. job, \$48,284.20 a mi. Other bidders were: W. J. Neese, Frankfort, \$49,365.50; Pfeismeier Constr. Co., Terre Haute, \$52,086.25; J. F. Campbell & Co., Bloomington, \$51,465.80; North & Holman, Rochester, \$52,303.91; Central States Constr. Co., Logansport, \$49,690.37.

**\*La., New Orleans**—W. B. Smith, Alexandria, only bidder, was awarded contr. for 8.65 mi. in Red River parish, at \$38,922. Hollier & Fisher, Melville, only bidder for 11.3 mi., St., Landry parksh, at \$74,455.

**\*Mich., Lansing**—Sandberg & Erikson, Manistique, awarded contr. for 4.833 mi. E. macadam rd. at \$54,200; Holmes & Burridge, Crystal Falls, 4.75 mi. A. Gravel rd. at \$25,300; Chas. Wren, Crystal Falls, 3.57 mi. A gravel rd. at \$11,771.

**\*Mont., Helena**—Contr. awarded Lindgren, Peterson & Thornton of Forsyth, for grading, draining and constr. of gravel surface on 3.6 mi. Yellowstone trail, at \$18,638.41.

**\*Nev., Carson City**—P. A. Quigley, Care of Valley Lumber Co., Lovelock, awarded concr. for rd. from Lovelock to Zola at \$94,291.29; other bidders: New Constr. Co., \$126,480.22. Armstrong & Baker, Fallon, one-half mi. south of Brown, \$16,372.40; other bidder, P. J. Conway & Sellman, \$22,197.50.

**Pa., Harrisburg**—Philadelphia Paving Co., Philadelphia, awarded concr. for 27,633 ft. road in Berks co., at \$60,423.75; bituminous mixture on broken stone base. B. Foster Co., Philadelphia, \$20,902 ft. rein. concr. in Berks co., at \$144,085.50. T. H. Gill Co., Binghamton, N. Y., 19,215 ft. rein. concr. in Bradford co., at \$150,568. E. M. Love & Son, Corry, Pa., 7,900 ft. in Erie co., at \$72,523.80.

**\*Wash., Tonasket**—R. L. Picken was awarded contr. for 27,633 ft. road in Berks co., at \$60,423.75; bituminous mixture on broken stone base. B. Foster Co., Philadelphia, 20,902 ft. rein. concr. in Berks co., at \$144,085.50. T. H. Gill Co., Binghamton, N. Y., 19,215 ft. rein. concr. in Bradford co., at \$150,568. E. M. Love & Son, Corry, Pa., 7,900 ft. in Erie co., at \$72,523.80.

**\*Wash., Tonasket**—R. L. Picken was awarded contr. by Douglas co. comrs. for 7 mi. road between Brewsters Ferry and Bridgeport.

### SEWERAGE.

**Ark., Springdale**—City will spend \$93,000 on sewer system. Work to begin at once.

**Fla., Monticello**—Municipal bond issue for constructing sewers voted. The mayor.

**Ia., Soda Springs**—Morris Bros., Portland, awarded issue of \$40,000 sewer bonds.

**Ill., Morton**—Plans being drawn for constr. of sewer system. B. L. Smith, engr., Pekin.

**Kan., Atchison**—Plans were submitted for inspection by utilities engrs. for constr. of White Clay creek sewer, to cost \$446,263.

**La., Plaquemine**—The mayor and impvt. Committee have arranged with J. B. McCrary Co., consltg. engrs., Atlanta, Ga., to furnish est. as to cost of installing sewerage system in city. Streets and sidewalks will be generally improved and combination of municipal water works system with electric lighting plant is expected.

**Mo., St. Louis**—Total est. for sewer work in Lansdowne dist. is \$250,000.

**Neb., Pender**—\$30,000 drainage bonds have been awarded in Thurston co.

**Neb., Ord**—City soon lets contr. laying 6-16-in. rein. concr. sewers in Main st. to cost \$98,000. Rohrbough Engrg. Co., 920 City Natl. Bank bldg., Omaha.

**N. J., Millville**—Plans drawn for constr. of sewers on west side. Cost, \$150,000. L. Kurtz, city clk.

**N. Y., Yonkers**—City council considering plans for house and storm sewer in Devoe, also in Jerome ave.

**O., Cincinnati**—City council considering constr. of sewer to connect with one in Kirby ave.

**O., Perrysburg**—Trunk sewer to meet needs for next 40 years planned by residents of Perrysburg and Rossford and adjacent vicinity, to connect with proposed intersecting sewer to be built by Toledo.